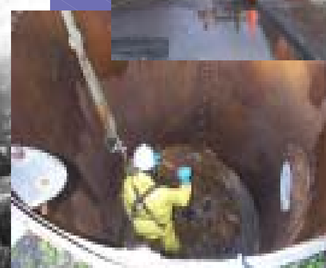
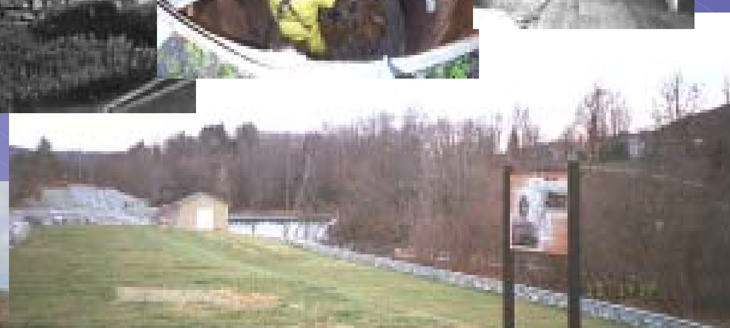
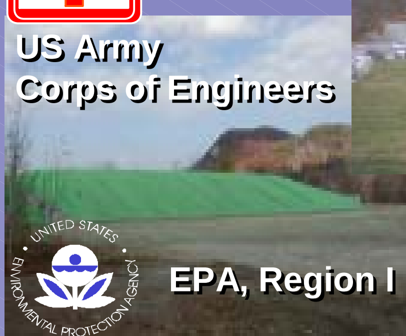
Removal Action Report
Non-Time Critical Removal Action
Pownal Tannery Superfund Site
North Pownal, Vermont
EPA CERCLIS ID No. VT 069910354

Prepared for
U.S. Army Corps of Engineers, U.S. EPA, Region I, & Vermont Department of Environmental Conservation

November 2001







Prepared by
Stone & Webster
A Shaw Group Company

Removal Action Report
NonTime Critical Removal Action
Pownal Tannery Superfund Site - North Pownal, Vermont
EPA CERCLIS ID No. VT 069910354
November 2001

REMOVAL ACTION REPORT
NON-TIME-CRITICAL REMOVAL ACTION

POWNAL TANNERY SUPERFUND SITE
NORTH POWNAL, VERMONT
EPA CERCLIS ID NUMBER VT 069910354

Prepared for:

Department of the Army
New England District, Corps of Engineers
Concord, Massachusetts

Stone & Webster Project Number 06851.08

Contract Number DACW33-97-D-0002
Delivery Order Number 0008

November 2001

Prepared by:

Stone & Webster
A Shaw Group Company

REMOVAL ACTION REPORT
NON-TIME-CRITICAL REMOVAL ACTION

POWNAL TANNERY SUPERFUND SITE
NORTH POWNAL, VERMONT
EPA CERCLIS ID NUMBER VT 069910354

Prepared for:

Department of the Army
New England District, Corps of Engineers
Concord, Massachusetts

Stone & Webster Project Number 06851.08

Contract Number DACW33-97-D-0002
Delivery Order Number 0008

November 2001

Prepared by:

Stone & Webster
A Shaw Group Company

[This page intentionally left blank]

TABLE OF CONTENTS

Section Page No.

TABLES

FIGURES

APPENDICES

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ACM	-	Asbestos-Containing Material
AHERA	-	Asbestos Hazard Emergency Response Act
APE	-	Area of Potential Effect
B&M	-	Boston and Maine
Beck	-	Beck Engineering, Inc.
BFML		Bottom Flexible Membrane Liner
C&D	-	Construction and Demolition
CFR	-	Code of Federal Regulations
Chenango	-	Chenango Contracting, Inc.
COC	-	Contaminant of Concern
CQC	-	Chemical Quality Control
Cy	-	Cubic yards
DOT	-	United States Department of Transportation
EE/CA	-	Engineering Evaluation/ Cost Analysis
FS/RI	-	Feasibility Study/Remedial Investigation
Ft bgs	-	Feet below ground surface
Gci	-	Geosynthetic clay liner
Gpm	-	Gallons per minute
GZA	-	GZA Geoenvironmental, Inc.
HDPE	-	High Density Polyethylene
Hill	-	Hill Environmental, Inc.
LLDPE	-	Low Density Polyethylene
LVI	-	LVI Environmental
MDL	-	Method Detection Limit
mg/kg	-	milligrams per kilogram
MOA	-	Memorandum of Agreement
MRD	-	Missouri River Division
NPL	-	National Priority List
PA/SI		Preliminary Assessment/Site Investigation
PCB	-	Polychlorinated biphenyls
PCP	-	Pentachlorophenol
PDI	-	Pre-Design Investigation
PE	-	Professional Engineer
PLM	-	Polarized Light Microscopy
ppb	-	parts per billion

ppm	-	parts per million
PRGs	-	Preliminary Remediation Goals
PVC	-	Polyvinyl Chloride
RCRA	-	Resource Conservation and Recovery Act
RI/FS	-	Remedial Investigation/Feasibility Study
ROD	-	Record of Decision
RPM	-	Remedial Project Manager
SACM	-	Superfund Accelerated Cleanup Model
S&W	-	Stone & Webster, A Shaw Group Company
SSL	-	Soil Screening Levels
sq ft	-	Square feet
STTF	-	Short-Term Transfer Facility
SVOC	-	Semi-volatile Organic Compound
TCLP	-	Toxicity Characteristic Leaching Procedure
TFML	-	Top Flexible Membrane Liner
TPH	-	Total Petroleum Hydrocarbons
TRC	-	TRC Environmental
µg/l	-	micrograms per liter
USACE / NAE	-	United States Army Corps of Engineers / New England District
USEPA	-	United States Environmental Protection Agency
VOC	-	Volatile Organic Compounds
VTDEC	-	Vermont Department of Environmental Conservation
VTHP	-	Vermont Division of Historical Preservation

1 INTRODUCTION

On behalf of the United States Army Corps of Engineers/New England District (USACE/NAE), Stone & Webster conducted a Non-Time-Critical Removal Action (Removal Action) at the Pownal Tannery Superfund Site in North Pownal, Vermont (Site). The overall scope of this effort focused on two of the three contamination source areas at the Pownal Tannery Site. At the Tannery Building Complex the scope included selected interior decontamination, building demolition and debris disposal, excavation and disposal of basement soil and sludge, and site restoration. At the Tannery Sludge Landfill a new leachate collection system and a multi-layer cap were installed for Cells 1,2 and 3. The Tannery Lagoons are being addressed by the United States Environmental Protection Agency (USEPA) under a Remedial Investigation/ Feasibility Study (RI/FS) and a final action was included in a future Record of Decision (ROD). This Removal Action was conducted to reduce the risk to human health and the environment posed by contaminated soil and sludge under the tannery buildings and in the landfill as well as the contaminates on exposed building surfaces. The work described herein was performed in general accordance with alternatives B-1A and LF-2 of the March 22, 1999 Action Memorandum (1) and the Removal Action Work Plan (2), developed with the input and approval or concurrence of the USACE, USEPA and the State of Vermont Department of Environmental Conservation (VTDEC).

1.1 BACKGROUND AND PURPOSE

This Closeout Report documents the Removal Action performed at the Pownal Tannery Superfund Site. The report was prepared in accordance with the USACE/NAE Contract Number DACW33-97-0002 Statement of Work for Delivery Order Number 0008, Removal Action, Pownal Tannery Superfund Site, North Pownal, Vermont, and the approved Work Plan.

The overall objective of the Removal Action, as described in the March 22, 1999 Action Memorandum (1) was to eliminate the source of the soil, groundwater, and sediment contamination at two of the three source areas on-site, and to protect current and future users of the Site, future users of the groundwater, and ecological receptors. In general terms, the Removal Action consisted of the decontamination of tannery buildings, deconstruction of the decontaminated buildings, and disposal of the uncontaminated materials off-site, excavation of soil and sludge contaminated above specified cleanup levels within tannery buildings, and disposal of the materials at an on-site landfill that was capped.

1.2 Document Organization

This Closure Report includes text and accompanying tables, figures, and project photographs. Section 1.0 discusses background information about the Site, the purpose of the Removal Action and organization of the Closeout Report. Section 2.0 presents a detailed history of the Site along with a summary of previous field investigations. Section 3.0 summarizes the removal actions performed at the main tannery complex as part of the Removal Action. Section 4.0 describes site investigation, inspection, and preparation activities performed at the landfill. Cap construction, leachate system repair, site restoration, and operation and maintenance are also described in this section. Section 5.0 summarizes removal action activities performed at the lagoon area. Section 6.0 discusses air monitoring activities. Section 7.0 discusses safety performance statistics for the project and Section 8.0 includes final project costs. Section 9.0 includes a listing of reference documents. Immediately following Section 9.0 are the figures and tables.

Appendices A through E contain data supporting the work described in the Closure Report. A single hard copy of these appendices has been transmitted to the USACE, USEPA and VTDEC in separate volumes. All other copies of this report have been distributed with CD-ROM versions of Appendices A through E.

2 SITE INFORMATION

This section presents a summary of a detailed site characterization presented in the November 1998 Engineering Evaluation/Cost Analysis (EE/CA) [3].

2.1 Site Description

The Pownal Tannery Superfund Site is located in the village of North Pownal, Bennington County, which is located in the southwestern part of Vermont (see Figure 1). The Pownal Tanning Company, Inc. operated a cow- and sheep-hide tanning and finishing facility at the Site between 1935 and 1988, when the company ceased operations and declared bankruptcy. Three areas of concern have been identified at the Site: the tannery building complex, a lagoon system, and the tannery's sludge landfill. In total, the Pownal Tannery Site encompasses approximately 28 acres as shown on Figure 2.

The primary tannery building complex consists of the northern, central, and block buildings (occupying approximately 169,000 square feet) and a separate screen house located to the northwest of the tannery building bounded by the Hoosic River to the west, by the Boston and Maine (B&M) railroad to the east and by undeveloped land to the south. The building complex is situated on approximately 3 acres.

A 16 acre lagoon system comprised of six unlined lagoons occupies a 22 acre parcel of land and is situated northwest of the tannery building complex.

The tannery sludge landfill is situated on Dean Road on a 3-acre parcel of land across from the Hoosic River and southeast of the tannery building complex.

North Pownal is a rural community with approximately 3,500 residents. Several residential properties are located near the building complex and the tannery landfill. The nearest residences are approximately 200 feet from the Site. Local residents use groundwater from private wells for their water supply.

Prior to this removal action the Site was unoccupied and access was unrestricted. While measures were taken by the VTDEC and EPA since 1988 to restrict access to the buildings and lagoons, youth trespassers consistently circumvented these efforts. As discussed in this section, past disposal operations at the tannery have resulted in the release of hazardous substances to the soil, groundwater, and surface waters/sediments of the Hoosic River. A Preliminary Assessment/Site Investigation (PA/SI) was conducted in January 1993 and a time-critical removal action was performed between April 1993 and May 1994 which removed hazardous substances that were contained in drums and tanks stored within the buildings.

2.2 Site History

2.2.1 Tannery Complex

From approximately 1937 until 1962, untreated tanning process wastewater was discharged directly from the tannery building into the Hoosic River through a system of floor trenches located in the basement of the tannery building complex.

2.2.2 Lagoon System

A screen house and the lagoon system were constructed in several stages between 1962 through 1971 to receive and provide limited primary treatment of the tannery's wastewater (see Figure 2). A clarifier process building was constructed in 1978 at the lagoon area. An estimated 250,000 to 300,000 gallons per day of wastewater were discharged to the lagoon system. The wastewater was conveyed from the tannery complex by approximately 800 feet of underground piping to the lagoon system.

By the 1980s, Lagoons 1, 3a, 3b, and a portion of Lagoon 4 were filled with the settled sludge and wastewater bypassed these lagoons and was channeled through the remaining lagoon system. In 1982, a state-permitted lined landfill (described below) was constructed on site to receive dewatered sludge dredged from the lagoons. Lagoon 1 was never dredged; it was covered in 1983 with a 1-foot layer of silt. An unknown quantity of sludge was removed from Lagoon 2 and placed in the tannery landfill. However, sludge remains in Lagoon 2 based on investigations conducted by EPA's contractor. Lagoons 3A and 3B were reportedly dewatered and capped; whether these lagoons were dredged is uncertain because of conflicting information presented in several reports. Lagoon 4, the largest unit, is of unknown depth. This lagoon was reportedly dredged and the dewatered sludge was transported and placed in the landfill. Subsequent investigations have identified the presence of sludge remaining in Lagoon 4. Precipitation or floodwater that accumulates in lagoon 5 is known to periodically discharge to the Hoosic River through an outfall pipe.

2.2.3 Tannery Landfill

The tannery landfill was designed for four independent cells. Two of the three lined cells (Cells 1 and 2) were closed and capped by the Pownal Tannery (also the property owner) at the direction of the state. Cell 3 was partially filled with dewatered sludge and had approximately 2,500 cubic yards of remaining capacity. At the time the Pownal Tannery Company ceased operations in 1988, Cell 3 remained uncapped. A planned Cell 4 was never constructed. Based on available data and evaluations by the VTDEC, it appeared that the cap covering Cells 1 and 2 was damaged by deep-rooted vegetation, and the bottom liner integrity was in question. Evaluation of groundwater analytical data was consistent with this assessment. Because Cell 3 was uncapped, it received precipitation infiltration and generated leachate. The leachate collection system was no longer being maintained, and accumulated leachate was believed to back into Cells 1 and 2 and overflow into groundwater.

2.3 Summary Of Previous Investigations

2.3.1 Preliminary Assessment/Site Investigation

Between 1988 and 1993 preliminary evaluations of the Site were conducted by EPA and the VTDEC. In 1993 EPA completed a Preliminary Assessment/Site Investigation (PA/SI). Based on the results of this inspection and due to potential threats to human health and the environment posed by on-site hazardous substances, a removal action was recommended. EPA approved an Action Memorandum to undertake a Time-Critical Removal Action in March 1993. The removal action commenced in April 1993 and included the removal of: compressed gas cylinders and asbestos-containing materials (ACM), tank contents, cans of tetrahydrofuran, suspected dioxin-containing wastes and one drum containing pentachlorophenol. Underground storage tanks were sealed to prevent public access. A breach in the berm of Lagoon 4 was repaired in 1993. The removal action was completed in May 1994.

In 1994 EPA identified the Site as a National Priorities List (NPL) caliber site and determined that the Site would be assessed under the Superfund Accelerated Cleanup Model (SACM) initiative. Under SACM, EPA conducted field investigations in 1995 to provide limited characterization of contamination at the lagoons, landfill and buildings on-site. A subsequent investigation was performed in 1997 to further characterize the nature and extent of contamination within the tannery buildings. Based upon the results of these investigations, EPA approved the initiation of an EE/CA in January 1998 to identify options for controlling and containing the source of the contamination at the Site (EE/CA Approval Memorandum). The Site was proposed for addition to the NPL in September 1998 and the listing was finalized on January 11, 1999.

Data collected to date indicate that Site contamination has not impacted the nearest residential wells. The town is currently assessing alternate water supplies.

2.3.2 Preliminary Remediation Goals and Revised Cleanup Levels

Preliminary Remediation Goals (PRGs) are the numerical chemical concentrations for environmental media that would not cause excess health risk to humans or result in the degradation of groundwater quality. Protection of human health and the environment can be achieved once a response action has addressed environmental media that contain contaminants in excess of these PRGs. The PRGs may be modified or revised prior to the response action implementation based on other factors to be considered by EPA. For the Pownal Tannery site, both site-specific and regulatory standards were used to develop the PRGs and clean-up levels. Table 2-1 presents the list of PRGs and clean-up levels used for the site.

Soil Screening Levels (SSLs) were calculated for metals (antimony, barium, cadmium, chromium, and nickel) and the semi-volatile organic compound (SVOC) bis(2-ethylhexyl)phthalate to be utilized as clean-up levels for the site. The EPA guidance document titled “Soil Screening Guidance: Technical Background Document”, May 1996 along with the State of Vermont Enforcement Standards were used to calculate site-specific SSLs based on laboratory analysis of soil samples collected beneath portions of the on-site building. In accordance with direction of the EPA, the greatest (highest concentration) calculated SSLs were used as remedial goals for soils located beneath the on-site tannery buildings.

Subsequent to the start of excavation, the EPA modified the clean-up levels for soil to reflect a better understanding of the planned future use for the site. Initially, the clean-up levels for soil were developed and presented assuming that the future use of the Tannery building area was to be commercial/industrial in nature. Since that time the building was demolished, the top foot of soil was removed and the RPM’s understanding of the future use of the site changed. The future use is now assumed to be a park scenario in which young children (1-6 years old) could access the park on a fairly frequent basis. This assumption of the future use as a park is most conservative because of site constraints. This area is unlikely to be developed as a future residential property because it is situated in the flood plain, adjacent to a freight railway and is zoned for commercial/industrial use. The revised clean-up levels impacted three SVOCs [indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and pentachlorophenol] and one metal (lead). The supporting documentation for the revised PRGs is contained in GZA’s 1999 Letter Report [4].

Table 2-1 contains a summary of the PRGs for the COCs used at the Site.

Table 2-1 Summary of Soil Screening Levels for Contaminants of Concern

Pownal Tannery Superfund Site North Pownal, Vermont Summary of Soil Screening Levels (SSLs) for Contaminants of Concern (COCs)						
	Human Health Risk					Site Specific SSL
	TetraTech (EE/CA)		USEPA			GZA
Contaminant	**Carc.**	**Non-Carc.**	**Carc (1e-6)**	**Carc (1e-5)**	**Non-Carc.**	
Benz(a)anthracene	2.6	--	1.9	19.0	--	--
Benzo(a)pyrene	0.300	--	0.190	1.9	--	--
Benzo(b)fluoranthene	2.6	--	1.9	19.0	--	--
Benzo(k)fluoranthene	25.8	--	19.0	190.0	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	3.78
Dibenz(a,h)anthracene	0.300	--	0.190	1.9	--	--
Indeno(1,2,3-cd)pyrene	2.6	--	1.9	19.0	--	--
Pentachlorophenol	11.9	--	9.5	95.0	4,328	--
Antimony	--	--	--	--	--	10.22
Arsenic	1.7	--	1.2	12	67.6	--
Barium	--	--	--	--	--	43,000
Cadmium	--	--	--	--	--	7.3
Chromium	--	--	--	--	--	12,333
Lead	1,000	1,000	--	--	--	--
Nickel	--	--	--	--	--	78.2
Dioxins (as 2,3,7,8-TCDD TE)	5	--	--	--	--	--
NOTE:	**All concentrations in milligrams per kilogram (mg/kg)**					

2.3.3 Pre-Design Investigations

In accordance with selected EE/CA alternatives B-1A and LF-2, a Pre–Design Investigation (PDI) was conducted by Stone & Webster to assess the structural integrity of the tannery buildings and further define the contamination and options for disposal of the tannery complex. In addition, the extent of the landfill cap and the configuration of the liner and leachate collection system were investigated by advancing test pits and researching property boundary records.

The following reports were prepared and submitted as part of the PDI:

- Pownal Tannery Site Asbestos Survey – May 1999 (5)
- Memorandum of Agreement (MOA) between EPA and the State of Vermont Division for Historic Preservation (VTDHP) – July 1999
- Pownal Tannery Section 106 Report – June 1999 (6)
- Evaluation of Disposal Options for Building Deconstruction Wastes – July 1999 (7)
- Disposal Characterization Results for Building Deconstruction Wastes – September 1999 (8)

The results of the PDI revealed significant structural deterioration of the tannery buildings. Based on the deteriorated condition of the tannery complex and in accordance with a negotiated MOA between EPA and the VTDHP, the decision was made to demolish the entire tannery building complex. A condition of the MOA stipulated photo documentation of the tannery complex prior to demolition. Stone & Webster' s subcontractor, John Milner Associates, Inc., completed the photo documentation of the tannery complex including the surrounding community and prepared the Section 106 Report.

The results of the PDI also revealed selected interior building surfaces that required decontamination prior to demolition. After these decontamination activities were completed, the building demolition debris (brick, concrete, wood and steel) met the VTDEC criteria for disposal at a construction and demolition (C&D) landfill.

Test pit investigations conducted by Stone & Webster at the landfill provided USACE with the information to develop design details for repairs to the leachate collection system and the landfill cap. The property boundary research revealed that a portion of the existing landfill anchor trench and perimeter fence extended beyond the western property line. The anchor trench and fence were relocated within the limits of the western landfill boundary. Test pit locations and property boundary information are documented on the as-built drawings in Appendix B.

[This page intentionally left blank]

3 TANNERY BUILDING COMPLEX

3.1 Site Preparation and Pre-Demolition Activities

3.1.1 Asbestos Survey

A survey to identify possible ACM at the Site was performed by Nobis Engineering, Inc. [5], a State of Vermont-licensed asbestos inspection subcontractor. Suspect areas were sampled using approved USEPA Asbestos Hazard Emergency Response Act (AHERA) methods. Approximately 50 samples were collected and analyzed using Polarized Light Microscopy (PLM) techniques.

Based upon analytical results obtained from the ACM was identified throughout the tannery buildings. These materials were identified as follows: (1) roofing material; (2) pipe insulation; (3) boiler insulation; (4) floor tile; (5) exterior shingles; (6) transite pipe; (7) concrete sealant; and (8) window caulking.

The condition of each ACM identified below was observed to be damaged to significantly damaged. Based on the condition of the ACMs, Nobis Engineering, Inc. recommended that the materials be removed prior to any demolition and/or renovation activities that might be planned for the site.

The following table summarizes the results of the survey:

Table 3-1 Asbestos Containing Material Survey Results

Pownal Tannery Superfund Site North Pownal, Vermont Asbestos Containing Material Survey Results	
Building Material	**Estimated Quantity of ACM**
Roofing Material – North Building	26,500 SF
Roofing Material – Central Building	22,000 SF
Roofing Material – Block Building	3,900 SF
Roofing Material – Clarifier Building	225 SF
Total Roofing:	52,625 SF
Pipe Insulation (Northern/Central Buildings)	1,200 LF
Boiler Insulation (Central Building - 1st floor)	15 SF
Floor Tile (Northern/Central Bldgs.)	1,700 SF
Exterior Shingles - (Central Bldg. – loading dock)	400 SF
Transite Pipe - (Northern/Block Buildings)	225 LF
Concrete Sealant - (Block Building slab)	100 LF
Window Caulking - (Screen House)	8 windows (4'x4')

3.1.2 Debris Characterization

As part of the Scope of Work, Stone & Webster was tasked with identifying and evaluating potential alternatives for disposal of waste material generated by the tannery decontamination and deconstruction activities. To support this task, Stone and Webster performed a survey to characterize the media expected to comprise the waste streams. These media consist of the following:

- Masonry walls and floors;
- Wood floors and beams;
- Structural steel;
- Interior debris consisting of wood pallets and dollies, scrap leather material, racks, carts, equipment parts, paper waste, empty drums and scrap metal;
- Sludge from basement trenches and pits;
- Liquid from landfill leachate collection system;
- Ash from the base of the stack;
- Soil from below the basement floor slab;
- Sweepings.

Samples of these waste materials were collected and submitted to fixed-base laboratories and analyzed for parameters relevant to the anticipated final disposition, regulatory requirements and off-site recycling/treatment disposal facility needs.

Laboratory final validated analytical data from the characterization were presented in the detailed characterization report prepared by Stone & Webster, September 1999, Disposal Characterization Results, and Evaluation of Disposal Options Report, July 1999 [7,8].

Based on the laboratory analysis results and disposal cost estimates, the most cost-effective disposal methods for project wastes are summarized as follows:

Table 3-2 Waste Disposal Method Summary

Pownal Tannery Superfund Site North Pownal, Vermont Waste Disposal Method Summary	
Waste Stream	**Disposal Method**
Masonry Walls and Floors	In-state C&D landfill
Wood Floors and Beams	In-state C&D landfill
Structural Steel	Steel broker/smelter
Interior Debris (Wood pallets and dollies)	In-state C&D landfill
Interior Debris (Scrap Leather)	RCRA landfill
Sludge from Basement Trenches and Pipes	On-site landfill
Landfill Leachate and Standing Water	Local municipal treatment facility
Ash from Base of Stack	Out-of-state C&D landfill
Soil from Beneath Basement Floors	On-site landfill
Tannery Residual Material	Industrial/RCRA landfill
Tank Contents (No.6 fuel oil)	Recycling/reclamation facility
Fluorescent Lamps and Ballasts	Lamps: Recycling/reclamation facility; Ballasts: TSCA landfill
ACM	Licensed asbestos disposal facility

3.1.3 Historic Resource Evaluation and Section 106 Compliance

A historic resources evaluation and assessment of effect was conducted in April through June 1999 for the Pownal Tannery, a nineteenth and twentieth century industrial complex located on Route 346 in North Pownal village, Town of Pownal, Bennington County, Vermont. This investigation was prompted by the proposed demolition of the major portion of the tannery to remediate hazardous wastes present there. The investigation was undertaken by John Milner Associates, Inc. in association with Stone & Webster Engineering Corporation [6].

The Pownal Tannery was determined eligible for the National Register of Historic Places by the VDHP. This report evaluates the significance of the Pownal Tannery and related properties and addresses the effects that this undertaking will have on these historic resources. Accordingly, its purpose is to assist the EPA in compliance with the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969; Executive Order 11593; and the implementing regulations contained in 36 CFR 800.

The major identified resource is the former tannery. The tannery consists of three attached blocks constructed at different times. The original, brick, central block, three stories in height over a raised basement, was constructed in about 1866 as a cotton mill. In 1940, after the mill's conversion to a tannery, a single story brick block was attached to the north end of the original block, while in 1965-1966, a concrete block addition was built to the south of the original block. Additional resources within the Area of Potential Effect (APE) of the proposed building demolition include a small hydroelectric dam built in 1955; a 1939 steel truss bridge; a c. 1881 former company store; and approximately 15 company houses including duplexes and single family dwellings.

The original and 1940s block of the tannery complex and the steel truss bridge were previously determined eligible for the National Register by the Vermont Division for Historic Preservation. The remaining surveyed resources are recommended eligible for the National Register as part of a larger North Pownal Mill Historic District.

The proposed demolition of the north and central building of the mill complex would have an adverse effect on the mill and on the larger historic district due to the demolition of the district's most prominent component.

Alan Dennis, PE, Senior Structural Engineer of Stone & Webster conducted an assessment of the structural condition of the building. Among his major findings were; severe erosion of the exterior brickwork at several locations due to weathering and the effects of corrosive vapors, major openings in the exterior brick wall, a settled and heaved basement floor, severe deterioration of the wood floor and subfloor, severe damage and deterioration of wood building columns, and excessive deflection of wood floor beams.

Therefore, due to extreme deterioration, extreme contamination, and high rehabilitation costs, demolition of most of the original and 1940 block of the tannery was recommended as the most appropriate action.

Since alternative means appeared inappropriate, mitigative measures were considered to compensate for loss of the historic property. Based on the results of consultation between the EPA and the VDHP the following mitigative measures were stipulated in a Memorandum of Agreement, executed on July 19, 1999:

- Section 106 Report

Copies of the report was deposited with the VDHP, the Bailey-Howe Library at the University of Vermont, the Vermont Historical Society, and the Pownal Public Library.

- 35 mm Black and White Archival Photographs

The interior and exterior of the tannery was recorded through 35 mm black and white archival photographs. 5” by 7” prints was deposited with the VDHP, the Bailey-Lowe Library at the University of Vermont, the Vermont Historical Society, and the Pownal Public Library.

- Public History Brochure

The history of the Pownal Tannery was summarized in the text and illustrations of a public history brochure. The format, content, and distribution of the brochure was determined in consultation with the VDHP.

- Outdoor Display Panel

The significance of the Pownal Tannery was summarized on an illustrated outdoor display panel. The format, content, and location was determined in consultation with the VDHP.

3.2 Tannery Complex Decontamination

3.2.1 Asbestos Abatement

Abatement of the ACM pipe insulation, tank insulation, window caulking, floor tile, exterior siding, transite pipe, transite board and concrete sealant identified in the ACM survey was completed by LVI Environmental (LVI). Final clearance testing for all abated areas was successful. Approximately 40 cubic yards (cy) of ACM was transported to an off-site disposal facility.

Note: Approximately 150 linear feet of pipe insulation and approximately 500 square feet (sq. ft) of roofing was left in place due to worker safety concerns related to structural stability of the Central Building in one area. Written approval was obtained from the VT Dept of Health on August 23, 1999 to segregate this remaining ACM during the building deconstruction and debris removal phase. Licensed abatement contractors (LVI and Maxymillian) and an abatement monitor (Catamount Environmental) were on site when required for this effort.

Abatement of the non-friable ACM from the roofs of the Northern, Central, Block and Clarifier area valve shed was also completed. Approximately 155 cy of ACM roofing was transported offsite. Abatement results are contained in the Stone & Webster’s June 2001 Final Report [9].

3.2.2 Tank Cleaning and Interior Debris Removal

Four aboveground steel (4) fuel oil tanks (2 vertical and 2 horizontal) located inside the tannery building complex were cleaned of No. 6 fuel oil. The tanks were removed from the tannery during building demolition and were transported to a steel recycling facility.

Approximately 12,213 gallons of No. 6 oil was transported to an off-site disposal facility including 50 gallons of residual oil which was removed from the associated fuel oil piping prior to demolition.

Interior building debris primarily consisted of wood pallets and dollies. Scrap leather material, racks, carts, equipment parts, paper waste, empty drums, scrap metal and fluorescent lamps/fixtures were also present. As part of a "decontamination" effort, interior debris characterized as hazardous waste was removed prior to building deconstruction.

A total of four samples were collected from the debris (one from a wood pallet, one from a wood dolly, and two from the scrap leather). The first leather sample, P-Leather-01, was a composite sample of several leather scrap piles located throughout all the buildings. The second leather sample, P-N1-Leather-02, was a grab sample from the scrap leather pile located on pallets on the first floor of the North Building.

Several SVOCs, including pentachlorophenol and 2,4,5-trichlorophenol, were detected at concentrations below Resource Conservation and Recovery Act (RCRA) Toxicity Characterization Leaching Procedure (TCLP) concentrations based on the 20-times rule of thumb estimate. Several RCRA metals were detected at concentrations below RCRA Toxicity Characteristic concentrations with the exception of chromium detected in leather sample P-Leather-01 at 54,700 µg/L which exceeds the RCRA TCLP concentration of 5,000 µg/L. Trace concentrations of dioxins (less than 1 ppb) were detected in the samples.

Approximately 350 fluorescent light ballasts, 343 fluorescent lamps and numerous electrical capacitors remained in the tannery buildings. All ballasts and capacitors unless positively identified as not containing PCBs, were managed as containing PCBs. These ballasts (3 drums) and the electrical capacitors (9 drums) were removed and transported for disposal to a facility licensed under the Toxic Substances Control Act (TSCA) to accept PCB wastes.

Fluorescent lamps were removed from fixtures and placed in cartons provided by a lamp recycler. Lamps were stored in a safe place to avoid breakage prior to being transported and disposed by a licensed recycler.

3.2.3 Tanning Residue Removal and Concrete Floor Scarification

During the Debris Characterization sampling program a dark brown powder, believed to be a tanning chemical, was observed in several areas of the first floor of the Northern Building. Analytical results obtained from samples of the powder and debris identified several VOCs and SVOCs including elevated levels of pentachlorophenol (PCP), 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol. These SVOCs were detected below RCRA TCLP concentrations based on the 20-times rule of thumb estimate. In addition, TCLP SVOC concentrations did not exceed actual RCRA TCLP concentrations. Several RCRA metals were detected at concentrations below RCRA Toxicity Characteristic concentrations. Dioxin was detected at 30.5 ppb from one sample at the center of the pile and 9.3 ppb from a sample taken from the perimeter of the pile. Due to the elevated levels of PCP and presence of dioxin, the powder was believed to be residual PCP powder, a biocide known to be used in the tanning process. Consequently the northern building decontamination waste was managed independent of the deconstruction material and disposed in an offsite industrial/RCRA landfill.

Decontamination activities in the Northern Building included sweeping and vacuuming to remove gross quantities of the residual powder from the floor and scattered debris followed by debris removal and ¼” scarification of selected areas of the concrete floor. The work was performed in Level C and water was used at all times for dust suppression.

Approximately 120 cy of PCP contaminated debris was removed from the first floor of the northern building. This material was transported to an off-site disposal facility.

Approximately 100 cy of hazardous scrap leather was removed from the Northern, Central and Blocks buildings and was transported to an off-site disposal facility.

A total of 41 drums of floor sweepings containing residual PCP tanning powder were removed from the first floor of the Northern Building and transported to an off site disposal facility.

Four (4) bulk confirmation samples were obtained of the Northern Building floor after debris and powder removal. One sample exceeded the action level for dioxin by approximately 1.6 ppb. This area, which represents approximately 3000 sq. ft, was scarified, and decontamination was completed on September 10, 1999. The residual concrete dust (approximately 3-4 cy) removed by scarification from this area was disposed of in Cell 3 at the on-site landfill.

3.2.4 Basement Trench Sludge Removal and Decontamination

One composite sample of the trench sludge was obtained from each of the basements of the north building, central building, screen house, and clarifier building for a total of 4 composite samples.

Several VOCs, SVOCs, and metals (TCLP) were detected at concentrations well below RCRA Toxicity Characteristic concentrations. However, all samples contained dioxin concentrations higher than 1.0 ppb. In accordance with recommendations made in the EE/CA (TetraTech, 1998), the sludge was removed and transported for disposal to the on-site landfill. The sludge was removed from the trenches using shovels and hand tools and transferred to roll off containers which were then transported to the on-site landfill. The tile lined trenches were cleaned to a “visually broom clean” condition.

Approximately 60 tons of non-hazardous sludge was removed from the basement trench system in the Northern and Central Buildings. The results from 11 of the 12 confirmation masonry samples, which were taken from the bottom of the trenches after cleaning, were below action levels. Additional decon in the area of the one sample which exceed TCLP chromium by 3.8 milligrams per kilograms (mg/Kg) was performed prior to demolition. The sludge was transported in lined roll-off containers and placed in Cell 3 at the on-site landfill.

Approximately 15 cy of non-hazardous ash was removed from the base of the boiler room stack. This material was also placed in Cell 3 of the on site landfill.

3.2.5 Pits and Vats

A bulk composite sample taken the large wooden salt brine paddle vats in the basement of the Northern Building exceeded the action level for dioxin by less than 1 ppb. These wooden vats, which were too large to remove prior to building deconstruction were segregated and managed separately from the C&D waste.

Clean Harbors pumped and disposed of 17,750 gallons of water from the pits in the Central Building.

3.2.6 Drum Removal

The majority of drums containing tannery chemicals or residual wastes were removed during previous removal activities at the tannery complex. However, ten additional drums were identified during the initial phase of building decontamination that either contained or were suspected to contain residual tannery material.

An initial screening was performed on the drums to consolidate similar materials for waste characterization sampling. Samples were collected in accordance with the Sampling and Analysis Plan [10] . The results of the initial screening are presented in Appendix D.

Since drums PT-D7, PT-D12, PT-D13, PT-D14, PT-D21, and PT-D23 contained less than one inch of residue, they were excluded from RCRA disposal requirements per RCRA Section 261.7, *Residues of Hazardous Waste in Empty Containers*. These drums were disposed as solid waste with the remainder of the tannery metal waste.

Liquid and solid material samples were collected from the remaining drums for waste disposal characterization in accordance with the Sampling and Analysis Plan. Results of the sampling are presented in Appendix D.

3.2.7 Eastern Wall Decontamination

Prior to demolition of the tannery complex, a sample of solid residue from the surface of the Northern Building basement eastern wall in the area of the former curing vats was collected. Sample analytical results are presented in *Disposal Characterization Results* [8] . Several SVOCs and RCRA metals were detected at concentrations anticipated to be below RCRA TCLP criteria for disposal. However, PCDDs/PCDFs were detected at 1.45 ppb TEV, exceeding the screening value of 1.0-ppb TEV.

As a result of the above analytical results and the presence of a thick black residue on the southern portions of the Central Building basement eastern flagstone wall, the entire tannery eastern wall was decontaminated via mechanical scrubbing followed by steam cleaning. The residue removed from the walls was collected and transported to the tannery landfill and placed in Cell #3 for disposal.

Confirmatory wipe samples were collected. Appendix D contains the analytical results for these samples. Concentrations of PCDDs/PCDFs were below the SSL.

3.2.8 Underground Storage Tank Removal

On 9/19/00 two empty 1,000 gallon fuel tanks were removed by Maxymillian Technologies from an area adjacent the exterior Southern wall of the Tanney Warehouse. Following removal of the tanks a headspace analysis was conducted at the Northern, Southern, Eastern, Western and bottom of each of the excavation faces. All assessments for VOCs were zero. Documentation samples were taken and analysis made for VOCs and TPH. Clean fill was then placed back into the excavation. The empty tanks were removed for scrap by C&R Trucking to their Hudson River, Port of Albany processing facility. During the tank removals, Mr. Andrew Shively of the VTDEC was present to observe the operation.

3.2.9 Tannery Warehouse Debris Removal and Decontamination

The former Tannery Warehouse was cleaned and selectively decontaminated in response to interior contamination discovered in manholes and pits by TRC Environmental, EPA's RI/FS contractor.

Stone & Webster's initial activity in the warehouse consisted of packaging and disposal of loose ACM and consolidation, sampling and disposal of unknown liquid containers and overpacks from the loading dock area. In addition, soil and sludge was excavated from six (6) manholes and two (2) concrete pits inside the building. The pits and manhole surfaces were scraped clean and backfilled with clean fill material and sealed with 8 inches of concrete.

A total of 59 drums of liquid and solid waste were generated from the warehouse cleanup activity.

The analytical results obtained for the ten (10) liquid samples, which were characterized as waste oils, revealed elevated levels of PCB's (38 - 66 PPM) and RCRA metals. The results for the seven (7) solid samples revealed elevated VOC's and trace dioxins. Dioxin was also detected at low levels in four of the seven liquid samples but at a low recovery due to matrix interference. The drums were transported by Franklin Environmental.

Following the initial debris cleanup effort, the floor and walls were selectively decontaminated by vacuuming followed by steam cleaning. Decontamination was completed on January 25, 2001. A total of 5 drums of liquid and 3 drums of solid waste were generated. The drums were secured in the southeast end of the warehouse. Samples were taken and submitted for analysis.

While removing the residual wood chip debris from the building a 20' wide x 13' high section of the north concrete masonry unit wall collapsed outward. No personal injury or equipment damage resulted from the incident but the 20' wall section was destroyed. The opening was secured with poly, chain link fence and caution tape. The estimated cost to replace the wall was $5400.

On closer examination of the building by the site manager and site safety officer several potential structural deficiencies were noted, such as missing diagonal bracing, corrosion of steel columns and cracks in exterior areas of the remaining block walls. Precautions were taken to protect workers during decon activities and a structural engineer was contacted to review conditions in the building.

Repairs to the concrete block wall were completed and a structural inspection letter report was prepared. The report was forwarded to the warehouse owner by EPA.

3.3 Building Deconstruction

3.3.1 Objective

The following building demolition, goals were established to facilitate meeting the RA objectives:

- Remove sources of contamination within or associated with the site buildings, including sludge from basement area drains/trenches, asbestos within the buildings, and the content of aboveground and underground tanks
- Decontaminated those portions of the interior of the tannery buildings that exceeded cleanup goals and are planned for demolition to minimize the volume of material requiring off-site disposal at facilities permitted to accept asbestos and Resource Conservation and Recovery Act (RCRA) hazardous wastes. The extent of decontamination for these portions of the complex was based on meeting acceptance criteria for off-site recycling and disposal facilities
- Decontaminated those portions of the interior of the tannery buildings that exceeded cleanup goals and will remain on site to below cleanup goals to minimize potential public health risks
- Demolished and removed the remains of structurally-unsound buildings following decontamination to minimize public health and safety risks

- Removed contaminated soil beneath the northern building that exceeded cleanup goals to prevent contaminant release to the adjacent Hoosic River
- Restored the Site following buildings demolition to minimize erosion and sedimentation effects on the Hoosic River and allow future use of the Site
- Minimized material handling during removal of contaminated material to prevent fugitive emissions
- Conducted the work in a manner that minimizes impact to the environment
- Conducted the work in a manner that minimizes the potential impact to the local community
- Completed the project efficiently and cost-effectively
- To the extent possible, improved the aesthetic appearance of areas of the Site where work was performed

3.3.2 Mobilization and Site Preparation

The following tasks were implemented to facilitate the mobilization and site preparation.

- Mobilization and set up of temporary trailers and sanitary facilities
- Conducted a baseline topographic survey of the tannery complex and landfill to establish baseline measurements to allow future monitoring of quantities and costs
- Clearing and Grubbing – Vegetation were cleared from the tannery and support areas
- Fence Installation/Security – The existing fence/gates were repaired, additional fencing added as necessary and Site buildings were secured to limit access to the property. Signage was added at key locations and access points to areas secured for the project.
- Erosion Control – Erosion and sedimentation control measures in work areas and near the riverbank were installed as necessary. Catch basins, manholes, and drains were also be protected as needed.
- Cap, Seal and Abandon or Protect Utilities – The tannery complex were de-energized. Existing gas, water, electrical, telephone and storm drain and sewer lines on site were located. Temporary water, electric and telephone services were established for Site trailers. The water service was established via a standpipe to the Hoosic River, in conjunction with the local Fire Department.
- Establish Laydown & Worker Parking Areas – Working with the USEPA and adjacent property owners, areas were established for temporary equipment and materials storage and worker parking.
- Establishment of Work Zones – Exclusion, Contamination Reduction and Support Zones for the project were established, and personal protective equipment and waste storage areas set up.
- Temporary Safety Measures – Areas of the Site buildings structurally unsuitable for foot traffic and small construction equipment (i.e., bobcats) were identified and either marked to exclude worker access (i.e., with temporary barriers and caution

tape/signs) or temporary mitigating measures implemented (i.e., bracing or placement of road plates).

3.3.3 Demolition

Demolition commenced from the Northern Building and continued in a southerly direction in the Central Tannery building complex to the Block Building. The demolition consisted of the following sequence of activities:

- Secured silt fence to riverside foundation of buildings to contain fallen debris. Protected the hydroelectric generating equipment to avoid damage during building demolition and weather-related damage following completion of this project.
- Demolished first floor north end of the north building to expose the concrete floor. Remove concrete floor and associated steel beams down to basement floor. The basement floor was utilized as a staging area, or Short Term Transfer Facility (STTF) for the remainder of demolition activities at the main tannery buildings complex. All demo material was gathered for sorting and loading out. Established a container/truck loading area on the north end.
- Demolished the northern building, working toward the central building and then the block building. A crane was used to take down the upper floors, and an excavator demolished the lower floors
- Removed the ~150-foot high smokestack in the northern building (as demolition progresses). The stack was taken down using a crane outfitted with a clamshell bucket down to about 50-75 feet and removed the remainder from the ground using a hydraulic excavator.
- Removed steel beams and structural steel using a hydraulic excavator equipped with a shear.
- Structural steel/steel beams and the cast iron boilers were removed debris following building demolition for on-site decontamination and transport for off-site recycling.
- Demolished concrete, stone, brick, and block walls using a hydraulic excavator equipped with a pulverizer.
- Moved demolition debris to the STTF for stockpiling, sorting and loading using the excavator and crane.
- Loaded debris into trucks or roll-offs using an excavator for direct hauling off-Site disposal.
- Covered the top of the trucks/rolloffs and decontaminated the exterior prior to leaving the Site for off-Site landfill disposal.

During demolition activities, care was taken to minimize any demolition debris from falling onto the railroad tracks or entering the Hoosic River. Ambient air monitoring was performed and dust suppression measures (e.g., water sprays) implemented to prevent the release of fugitive emissions during demolition of the buildings may result in the release of fugitive emissions.

Disposal of the debris occurred at off-Site RCRA Subtitle D or Subtitle C landfills, or asbestos landfill(s) or a Toxic Substance Control Act (TSCA) permitted facility for polychlorinated biphenyl containing materials, depending on waste characteristics. Every attempt was made to segregate material to minimize the volume of RCRA and asbestos-containing waste requiring off-Site disposal

Certified on-Site weigh scales were installed to increase load-out productivity and ensure maximum loading of trucks/roll-offs. All materials were loaded out in a manner to maximize truck/container capacity – whether by volume, weight, or both (but remain within U.S. and Vermont Departments of Transportation road/bridge weight limits). All materials transported off Site for disposal/recycling were tracked via manifests or bills of lading (as appropriate) in accordance with USEPA and VTDEC regulations.

3.4 Waste Transportation and Disposal

All waste generated by the activities at the Pownall Tannery site were analyized to determine if the waste was hazardous. As with any other solid waste, remediation wastes were subject to RCRA Subtitle C hazardous waste only if they were listed or identified hazardous waste. Environmental media (i.e., masonry, wood, etc.) were subject to RCRA Subtitle C only if they contained listed hazardous waste, or exhibited a characteristic of hazardous waste.

This definition of hazardous waste is consistent with the State of Vermont (VT) Agency of Natural Resources "Hazardous Waste Management Regulations," September 30, 1998 [(11)].

Non-hazardous C&D debris was landfilled in either RCRA Subtitle D municipal solid waste (MSW) or C&D landfills. It is important to note that specific acceptance criteria for these landfills vary according to the facility's state and local permit requirements. In the case of non-hazardous soil, the transportation of the material was managed by Petricia Construction to Burgess Brothers, Inc., in Bennington, Vermont. Wastes intended for off-site recycling/disposal were sufficiently characterized, specific waste codes were assigned to each waste (as applicable). Non-hazardous scrap metal was transported by C & R Trucking to the Hudson River Recycling in Hudson New York. Table 3-3 summarizes the quantities and destination for all generated waste and Appendix C contains waste shipping records.

Any generated waste defined as hazardous waste was disposed of in a RCRA Subtitle C landfill, and was subject to applicable land disposal restriction treatment standards (40 CFR 268) if disposed of off-site. In addition, the Vermont Department of Environmental Conservation (VTDEC) Hazardous Waste Management Regulations [(11)] state that land disposal of any hazardous waste in the State of Vermont may be restricted for waste: (1) which may present an undue risk to human health or the environment, immediately, or over a period of time; or (2) which would be incompatible with the *Groundwater Protection Rule and Strategy* of Chapter 12 of the Environmental Protection Rules.

Waste Profile Sheets were completed and submitted to the proposed recycling/disposal facility for acceptance. Stone & Webster's Regulatory Specialist reviewed the status of each proposed transporter and receiving facility to verify that the company facility was permitted to manage the proposed waste and that the facility was in good standing with federal and state authorities, with no current Notices of Violations. Information on waste transport and off-site recycling/disposal facilities passing this initial screening were submitted to the USACE-NED for review and approval. Upon approval of the waste shipment by the receiving facility and subsequent facility approval by Stone & Webster, shipping documentation was prepared in accordance with the U.S. Department of Transportation (DOT) requirements (49 CFR 171-179), Toxic Substances Control Act (TSCA), Massachusetts hazardous waste management regulations (310 CMR 30.00), and MCP regulations (310 CMR 40.0000). Generated waste defined as hazardous were transported by Safety-Kleen (North East), Clean Harbors, and Price Trucking. Table 3-3 summarizes the quantities and destination for all generated waste.

Table 3-3 Summary of Generated Waste at Pownal Tannery Site

Pownal Tannery Superfund Site North Pownal, Vermont Summary of Generated Waste			
Description of Waste	**Unit**	**Quantity**	**Destination**
Tank Emptying &Cleaning- (4 tanks w/#6 oil)			
Liquid Waste (#6 oil)	gal	13,500 [a]	Off-Site
Solid Waste	drums	22	
Trench Cleaning/Sludge Removal			
Sludge	cy	5.0	Off-Site
Asbestos Abatement			
North Building Roof	sf	32,073	Off-Site
Central Building Roof	sf	23,943	Off-Site
Block Building Roof	sf	4,290	Off-Site
Total Asbestos Abatement	sf	60,306	Off-Site
Removal of Ballast and Bulbs			
PCB Fluorescent Ballast	lbs	1,692	Off-Site
Fluorescent Bulbs	lf	1,204	Off-Site
Removal of #6 Oil from Piping			
#6 Oil	gal	165	Off-Site
Removal of Capacitors			
Capacitors	lbs	2,832	Off-Site
Removal of Tannery Waste			
Drummed Power	lbs	20,000	Off-Site
Leather Hides	ton	44	Off-Site
Non Hazardous Debris	ton	40	Off-Site
Removal Of Wood Vats			
Wood Vat Debris	ton	50.72	Off-Site
Wood Vat Debris Transport	roll off	5	Off-Site
Decontamination and Demolition of Clarifier Building			
Clarifier Building / Tanks Debris	ton	10.0	Off-Site
Demolition of Buildings			
Brick/Masonry/Concrete Debris	ton	10,388.48	Off-Site
Wood Debris	cy	2,543	Off-Site
Recycle Scrap Steel	ton	650	Off-Site
Mixed Demolition Debris	cy	7,347	Off-Site
Excavation and Removal of Contaminated Soil			
Soil North/Central Buildings	cy	5,958	Off-Site
Contaminated Soil	ton	6,506	On-Site
Brick	ton	508	On-Site
Disposal of Unknown Drums			
Unknown drums in Central Bldg.	drums	9	Off-Site
Petroleum Soil Central Building	cy	1,062	On-Site

Fieldstone Wall Demolition and Excavation			
Soil/Fieldstone/Concrete/Brick	ton	764.85	Off-Site
Description of Waste	**Unit**	**Quantity**	**Destination**
Demolition of Brick Wall at Southern End of Central Building			
Brick Debris	cy	120	Off-Site
Preparatory Clean up of Warehouse			
Removal and Disposal of Drums	drum	50-60	Off-Site
Woods Road Soil Removal and Restoration			
Contaminated Soil	ton	3,651.80	Off-Site
NOTE: a	Quantity is based on a minimum of 13,500 gal.		
gal	gallons		
cy	cubic yards		
sf	square feet		
lf	linear feet		
lbs	pounds		

3.5 Soil Excavation

3.5.1 Basement Soil Pre-Deconstruction Characterization

Soil samples were collected from beneath portions of the Northern and Central Buildings to calculate site-specific SSLs and identify the vertical extent of soil to be removed from beneath the existing brick/concrete basement floor slab.

Grab samples were collected for on-site field screening analysis and off-site laboratory confirmation analysis for the purpose of identifying the approximate extent of soil that exceeds cleanup goals.

Three vertical grab samples [0-0.5, 1-1.5, and 2-2.5 feet below ground surface (ft bgs)] were collected from eight sample locations within the Northern Building and six locations within the Central Building. Sample locations, shown in Figures 3 and 4 for the Northern and Central Buildings, respectively, were selected by configuring a rectangular (100-ft by 50-ft) grid. The configuration of this grid incorporated a combination of both biased sampling in the vicinity of the trenches and systematic grid sampling as described in "Requirements for the Preparation of Sampling and Analysis Plans," (USACE, 1994).

At each sample location, a Bobcat 863H was used to hammer through the brick and concrete slab to access the soil directly beneath. The thickness of the floor slab was recorded. A grab sample from 0 to 1.5 ft bgs was collected using a hand-auger in accordance with "Addendum to Abbreviated Sampling and Analysis Plan" (Stone & Webster, 1999). Using the Bobcat, an auger was advanced to 1 ft and removed, and a grab sample from 1-1.5 ft was collected as above. Similarly, the Bobcat auger was advanced to 2 ft, and a grab sample from 2-2.5 ft was collected as above. All samples were homogenized and placed in sample containers.

When the sampling program was completed, each sample location was sealed with concrete to the existing floor elevation to prevent the possibility of contaminant transport to the basement soil through the sample floor openings in the case of an accidental spill or discharge during deconstruction.

All samples were screened for pentachlorophenol using the ENSYS, Inc. PENTA RISC Soil Test System; Total Petroleum Hydrocarbons (TPH) using the PetroFLAG Dexsil Analyzer for hydrocarbons; and chromium and lead by laboratory analysis method 6010A (utilizing 48-hour turnaround) at an off-site laboratory. Field sampling methods are described in "Addendum to Abbreviated Sampling and Analysis Plan" [10]. In addition, per request of the USEPA, one sample from each location was submitted to an off-site, Missouri River Division- (MRD-) validated laboratory, Columbia Analytical Services, Inc. (Columbia) for dioxin analysis.

Based on the screening results, four samples were selected by GZA GeoEnviromental, Inc. (GZA) for analysis of site-specific COCs determined in the EE/CA that did not have cleanup goals associated with them. These COCs consisted of metals (antimony, barium, cadmium, chromium and nickel) and bis(2-ethylhexyl)phthalate. The results were used to calculate site specific SSLs.

Ten percent of the screening samples were sent to an off-site, MRD-validated laboratory, GZA, for confirmation analysis of all contaminants of concern (e.g.: pentachlorophenol, benzo (a) anthracene, bis (2-ethylhexyl) phthalate, benzo (b) fluoranthene, benzo (k) fluoranthene, benzo (a) pyrene, indeno (1,2,3-cd) pyrene, dibenz (a,h) anthracene, antimony, arsenic barium, cadmium and nickel.

In addition to the above analytical sampling, all screening samples collected from 2.5 feet bgs were analyzed for antimony, barium, cadmium and nickel to determine if and to what extent additional characterization below 2.5 feet is required.

While clearing and advancing the soil borings, it was found that the most of the basement floor in Northern and Central Buildings is generally comprised of approximately 1 layer of brick and an average of 18" of concrete. In the southwestern portion of Central Building around the hydropower plant area, the concrete floor slab thickness is greater than 2.5 feet. At location P-CB-S101, the concrete was cleared to approximately 2.5 feet below before abandoning the boring.

Screening results for pentachlorophenol, TPH, chromium and lead are presented in Appendix D. Screening data including a summary of pentachlorophenol and TPH field screening results and EPA Method 6010 results for lead and chromium is also presented in Appendix E. Five samples (10% of the screening samples) were submitted to GZA for confirmation of the pentachlorophenol screening results. Laboratory analytical data for confirmation samples is presented in Appendix D.

Samples P-NB-S109-0.5, P-NB-S109-1.5, P-CB-S103-0.5 were selected for use in calculating SSLs due to their elevated chromium concentrations, and P-NB-S103-2.5 was selected due to its elevated pentachlorophenol screening reading. These samples were submitted to GZA and analyzed for antimony, barium, cadmium, chromium, nickel and bis(2-ethylhexyl)phthalate in accordance with the USEPA soil screening guidance provided in the guidance document titled "Soil Screening Guidance: Technical Background Document," dated May 1996. The report summarizing the calculation of the site specific SSLs was completed by GZA in November 1999 [4]. A summary of all Site SSLs, including those established in the EE/CA is provided in Table 2-1.

All analytical data from screening and confirmation analyses were compared to the SSLs to determine the extent of soil to be removed from the Northern and Central Buildings' footprint. Contaminant concentrations in three of the nine locations in the Northern Building footprint and two of the five locations in the Central Building footprint exceeded SSLs (See Table 2-1). These exceedances are as follows:

- Antimony (SSL = 10.22 mg/kg) at locations P-NB-103, P-NB-S108, P-NB-S109 and P-CB-S103
- Arsenic (SSL = 1.7 mg/kg) at locations P-NB-S101, P-NB-S102, P-NB-S103, P-NB-S104, P-NB-S105, P-NB-S107, P-NB-S108, P-NB-S109, P-CB-S103, P-CB-S105 and P-CB-S106
- Chromium (SSL = 12,333 mg/kg) at location P-NB-S109
- SVOCs at P-NB-S103, P-NB-S108 and P-NB-S109.

Additional sampling at locations where SSLs were exceeded is required to determine vertical extent of contamination. In addition, because only limited data was collected from other locations, additional data is required to confirm that contaminant concentrations are below SSLs.

The findings presented herein show that, at a minimum, 3 feet of soil must be removed to meet site-specific SSLs. In order to (1) determine further vertical extent of COC concentrations at locations where SSLs were exceeded, and (2) confirm COC concentrations at other locations do not exceed SSLs, it is recommended that additional soil samples be collected from the same locations at deeper depths in one-foot intervals beginning at 3 feet bgs.

<u>Basement Soil Post-Deconstruction Characterization</u>

On November 3rd and 4th, 1999 nine additional boring (Appendix E and Figures 3 and 4) were conducted at one foot intervals at the same location as the previous basement survey to (1) determine further vertical extent of COC concentrations at locations where SSLs were exceeded, and (2) confirm COC concentrations at other locations do not exceed SSLs.

Results of the deeper investigation and Stone & Webster's comparison of the preliminary data to the site-specific SSLs are summarized below and were previously transmitted with the Draft Basement Soil Evaluation Report dated November 23, 1999. With the exception of arsenic (discussed below) only two exceedances of SSLs below 3 feet were observed as follows:

- Antimony was detected in sample P-NB-S109 (4-5') at a concentration of 11.2 mg/kg. This exceeds the SSL of 10.2 mg/kg. Since this sample was collected below a trench, considering a 2' deep trench, actual depth is 6-7' bgs. This required excavation down to 7 feet bgs and removal of approximately 450 cubic yards of soil in this area. Note that antimony was not detected in samples collected in the one-foot intervals above and below this sample.
- Nickel was detected in sample P-NB-S102 (4-5') at a concentration of 97.3 mg/kg. This exceeds the SSL of 78.2 mg/kg. This required excavation of 1 foot (approximately 75 cubic yards). Nickel concentrations in samples collected in the one-foot intervals above and below were 29.0 mg/kg and 28.7 mg/kg, respectively.

Arsenic was detected in all samples ranging from 2.8 mg/kg to 16 mg/kg. All detected concentrations exceed the SSL of 1.7 mg/kg, which was established in the Action Memorandum based on protection of human health. Estimates were made to determine an

SSL based on groundwater protection criteria. Using a combination of historical TCLP concentrations and current soil total concentrations, it appears that the GW protection SSL is greater than the maximum detected arsenic concentration of 16 mg/kg.

Note that lead was the only other COC that was established based on protection of human health. SPLP data for lead was reviewed and it was determined that since SPLP concentrations were "ND," (i.e.: negligible leaching), the human health-based SSL of 1000 mg/kg as established in the Action Memo is appropriate.

3.5.2 Fieldstone Wall Excavation/Underground Storage Tank Removal

During removal of No. 6 oil contaminated soil a partially filled underground tank was located immediately East of the former location of the Central Building. The tank was 12 feet in length and 5 feet in diameter. Analysis was conducted of the liquids and sludges found in the tank for VOA, flashpoint, pesticides, SVOAs, herbicides, pesticides, corrosivity, RCRA metals, PCBs, Ph, reactivity, and TPH. The results found the material (liquid and solid) to be flammable. The liquid was hazardous due to its ignitability and the solid material was hazardous due to both its ignitability and toxicity (chromium) characteristics. In addition, the benzene, toluene, ethylbenzene, and xylene concentrations were elevated in both phases.

Maxymillian Technologies removed and temporarily stored on site 1,200 gallons of liquid and 12 drums of solid materials from the tank. Following a cleaning of the tank interior, the empty tank was removed for scrap by C&R Trucking to their Hudson River, Port of Albany processing facility. Safety-Kleen, Inc. was used to haul the liquids and solids offsite to their processing facility located in Bridgeport, New Jersey. During the tank removal, Mr. Andrew Shively of the VTDEC was present to observe the operation.

Following removal of the tank, approximately 160 cy. of soil and 56 cy. of fieldstone were excavated from around the former location of the tank. Soil was excavated to the South and East to the limits of previously undisturbed concrete. Soil was removed to the North approximately 20 feet and underneath the former tank location until shale was encountered.

Headspace analysis was conducted on the Southern, Eastern and bottom faces. VOC values read ranged from 390 to 436 ppm. Documentation samples were collected at the at the excavation limits on the Southern, Western and bottom faces. Documentation samples were analyzed for metals, SVOCs, TPH and dioxins. Following the taking of the documentation samples, the excavation was lined with poly to define the extent of excavated area. Clean fill and rip-rap were then place to create a slope.

3.5.3 Woods Road Disposal Area Reclamation

TRC Environmental discovered evidence of buried tannery waste adjacent to Woods Road in August 2000 while conducting sampling for EPA to support an RI/FS for the Pownal Tannery Site. The site is located in close proximity to the Pownal Tannery on the west bank of the Hoosic River adjacent to Woods Road in North Pownal, Vermont. The soil was intermingled with miscellaneous masonry building debris, broken glass, metal scraps and tannery waste residue including fragments of leather hides. Since the area was determined to be a former tannery solid waste disposal site, Stone & Webster was directed to excavate to the extent shown on the TRC's test pit logs and contour map, i.e. to natural riverbank soil profile with no confirmatory sampling.

The analytical results from TRC's initial investigation, supplemented by TCLP metals analysis from the archived samples, was determined to be adequate for disposal characterization. Therefore, no additional sampling was undertaken. The material was classified as non hazardous soil and debris.

The disposal area excavation and restoration work was completed on December 8, 2000. The total volume of soil excavated was 2450 cy. Transport and disposal was completed on December 13, 2000 and 3651 tons (107 truckloads) was transported to a lined facility, the Waste Management Turnkey Landfill, in Rochester, NH.

Four (4) uniformly spaced documentation samples were obtained from the bottom of the excavation.

The excavation face was graded to a 2:1 slope and 160 yards of topsoil tailings, obtained from Barlow's Pit, was placed on disturbed areas followed by seeding and installation of an erosion control mat. A final contour survey was completed on December 11, 2000. Pembroke Landscaping of Bennington, VT installed the woody plantings specified by USACE.

The brick pump house structure at the north end of the site was demolished down to the base slab and the building footprint was backfilled and graded. The deteriorated wooden cover over the manway for the adjacent cistern was removed and two heavy metal plates were installed. A shallow valve pit with a rotten wooden cover located on the east Woods Road shoulder was also backfilled. The Woods Road entrance and guardrail were also restored.

The soil stockpile staging area adjacent to the former tannery warehouse building was scrapped down to virgin soil, tarps and poly were removed, clean filled was placed in low areas and the site was restored to original condition.

3.6 Tannery Site Restoration

Following the completion of demolition activities, the Site was restored and project facilities/services removed. The process consisted of the following:

- Backfilled excavated basement areas to conceptual cross-section details.
- Revegetated disturbed areas by seeding with native grasses and other vegetation, and mulching.
- Stabilized riverbank by utilizing rip rap and geotextile fabric.
- Removed project decontamination facilities.
- Removed erosion and sedimentation controls.
- Removed all Site utilities installed for the project.
- Demobilization of remaining Site facilities and contractors.

[This page intentionally left blank]

4 POWNAL TANNERY SLUDGE LANDFILL REPAIR AND CLOSURE

4.1 Site preparation and pre construction activities

Prior to initiating construction activities at the Pownal Tannery Landfill several pre-construction investigations and tasks were completed. These tasks included: clearing and grubbing, property line survey, leachate system pump down, leachate tank closure and placement of tannery soil and sludge in Cell 3.

The Pownal Tannery sludge landfill was originally designed with four lined and capped cells and a leachate collection system consisting of a polyvinyl chloride (PVC) pipe header, concrete manholes and a 6000 gallon steel tank. Cells #1 and #2 were filled to capacity and capped. Cell #3 was partially filled and not capped at the time the Pownal Tanning Company ceased operations in 1988. Cell #4 was never developed.

4.1.1 Property Line Survey

The property line was surveyed and staked along the western perimeter by Hill Engineering, Inc. (Hill). The survey revealed that the property line was not the existing fence line as originally believed. The property line was actually 14-feet from the existing fence on the southwest end of the landfill and as close as 5-feet from the existing fence on the northwest end of the landfill. As a result, investigation activities began on September 22, 1999 at the western perimeter to determine if liner and/or sludge materials were outside Tannery property.

Construction began with excavation of cover soils above the top flexible membrane liner (TFML) along the entire western perimeter of the landfill. The excavation uncovered the TFML, the existing liner anchor trench, and portions of the bottom flexible membrane liner (BFML). The limit of the BFML was exposed under the existing fence and the limit of the TFML was exposed on tannery property. The BFML was in good condition with no breaks, tears, or staining. The integrity of the liner material appeared to have been maintained. Test pits were conducted to determine the limits of sludge materials with respect to the new property line. The test pits revealed all sludge materials were 5-feet from the property line and on tannery property. No sludge was found outside tannery property along the entire western perimeter of the landfill.

Sludge material was excavated to allow the TFML and BFML to be peeled back into the landfill and off the abutting property (Owner-Robert Barlow). The sludge material was backfilled into cell #3 of the landfill. Once all liner materials were on tannery property and properly anchored, clean material was backfilled into the excavation on the abutters property and the tannery property.

4.1.2 Leachate Collection System Pumping

The existing collection system consisted of a 6,000-gallon steel tank, four concrete manholes and a PVC pipe collection header. The leachate collection system had not been maintained for a number of years. Consequently, the leachate tank was filled to capacity and there was surcharged water in manhole #3 and visible standing water in Cell 3. On September 2, 1999, the liquid in the collection system was pumped into a fractionation tank in an attempt to investigate the location of existing collection system piping and to estimate the volume of liquid stored in the system. Pumping activities were conducted for three full days removing approximately 16,000 gallons without changing the level of liquid in the leachate collection system. The liquid was sampled from both the fractionation tank and the existing leachate tank for RCRA metals, Volatile Organic Compounds (VOC's), SVOC's, dioxins, pH, conductivity, temperature, turbidity, reactivity, and ignitability. Sampling results were submitted to the VTDEC to determine a method of disposal. In an October 1, 1999 memorandum the VTDEC approved the pumping of leachate through a series of 10-micron filters and discharge over the sideslope of Cell #4 while conducting sampling.

Pumping began on November 9, 1999 to drain the standing liquid from the undeveloped section of Cell #3. Sampling was conducted every hour during pump down to measure pH, conductivity, and temperature of the liquid after cycling through the 10-micron filters in accordance with the VTDEC memorandum. See Appendix E for sampling results. Visual inspections were also conducted of the liquid discharged. If a change in color or odor was detected, the pumping event was stopped. This did not occur during any pumping event. The standing water at the bottom of Cell #3 was pumped down within one day at a rate of approximately 200 gallons per minute (GPM).

The collection system recharged during the placement of basement soils in Cell #3. Pumping was again required on January 10, 1999 for approximately one day to drain the existing tank and manhole #3. This pumping event was conducted to decontaminate and close the existing 6000-gallon tank. See Appendix D for sampling results.

4.1.3 Leachate Tank Closure

Field investigation in the vicinity of the existing leachate tank revealed the tank was encapsulated in the BFML of the landfill and removal of the tank would require a substantial excavation. Therefore, the existing 6,000-gallon leachate tank was abandoned in-place to avoid damage to the bottom liner and to avoid the installation of costly shoring and bracing. The existing tank was pumped dry, decontaminated by rinsing with one tank volume of leachate and backfilled with flowable fill. The riser section of the tank was removed and the tank was covered with soils from the excavation. The exposed sections of the four concrete manholes were also removed.

4.1.4 Soil and Sludge Placement in Cell #3

Cell #3 was prepared to accept contaminated soil and sludge removed from the basement of the tannery building. Brush and stumps were stripped from the surface of the cell and stockpiled separately in Cell #4. Clean cover soils were removed to within 1-foot of sludge material and stockpiled in cell #4. By removing the cover soils, additional airspace and a containment cell in Cell #3 were created to receive basement soils. The airspace originally identified in the EE/CA for Cell #3 was estimated to be 2,500 cy. However, after removing the cover soils and recalculating the airspace based on the final design top elevation, the available capacity was increased substantially. The airspace available in cell #3 was found to be approximately 7,500 cy.

The hauling, transporting and placing of basement soils began on November 15, 1999. Some of the basement soil placed in Cell #3 were saturated, contained 25% fines, and were initially difficult to compact. The material was spread in 12-inch lifts using a low ground pressure bulldozer however, the only compaction being achieved was that from the equipment spreading the material. Lifts containing drier materials were compacted without vibration using a roller. Compaction testing was conducted on the basement material on

November 18, 1999 to determine compaction achieved with multiple passes of a 10-ton roller. An average compaction of 75% was achieved with three passes of the roller. Approximately 800 cy of cover material that was free from debris was removed from the landfill and stockpiled in Cell #4. In addition, approximately 600 cy of cover material was screened to remove brush and stumps. All cover material was placed in Cell #3 of the landfill prior to cap construction and all brush and stumps were hauled and disposed off-site.

A temporary 12-mil PVC flexible membrane was installed over cells #1 and #2 on December 14, 1999 as a winter cover. Additional flexible membrane was installed over cell #3 on January 28, 2000. Chenango Contracting, Inc. (Chenango) installed the winter cover including placement and anchoring of the flexible membrane with sandbags. The silt fence and haybales on-site were inspected and repaired. All construction activities at the landfill ended for the winter on January 28, 2000. Inspections were conducted by S&W to assure all temporary liner materials were in tact, to check liquid levels in the leachate tank, and to assure that the site was secure.

4.2 Leachate Collection System Construction

A new leachate collection system was constructed for Cells 1, 2 and 3 which included the following major components:

- An 8,000 gallon double wall fiberglass coated steel tank
- Double wall high-density polyethylene (HDPE) leachate collection header pipe
- Single wall HDPE lateral connections
- Tank level monitoring and alarm equipment

4.2.1 Leachate Tank and Piping

The location for the 8,000-gallon double wall steel tank was adjusted from the location shown on the USACE Project Drawings. The location was shifted 8-feet west due to the proximity of a 2:1 slope with unknown stability. A shoring design and plan were prepared and approved by USACE prior to excavation. The 18-foot excavation was completed with steel sheet pile shoring installed as designed. Based on a test pit performed prior to excavation for the tank, it was anticipated that the water table would be encountered at 8-feet below grade. The groundwater table was not encountered within the excavation. Small perched water pockets were encountered and no dewatering was required. The tank was installed in accordance with the plans and shop drawings.

The leachate collection header was installed within the limits of the landfill access road as close to the centerline as possible. The double walled header pipe consists of a 6-inch primary pipe and a 10-inch secondary pipe constructed of HDPE material. Approximately 400 linear feet of header pipe was installed from the new tank to the cell #1 leachate collection lateral. Clean-outs for the header pipe were installed at four locations, one near each of the existing lateral lines for each cell and one near the new leachate tank. The header pipe connects to a fiberglass sump where the secondary piping ends and the primary pipe continues into the tank. The entire leachate header pipe was pressure tested to assure there were no leaks in the system.

The existing single wall PVC collection laterals in cells #1, #2, and #3 were connected to the new leachate header via new HDPE single wall pipe. Furnco fittings were used to connect the PVC to the HDPE pipe. The single wall HDPE pipe was butt fusion welded to the new leachate collection header pipe.

4.2.2 Monitoring Equipment

Monitoring equipment was installed to measure liquid levels in the new leachate tank and to monitor for leaks in the collection system. The monitoring system includes the following components:

- Central Processing Unit - OEL 8000
- Interstitial tank space probe
- Header pipe leak sensor
- Tank liquid level probe

The OEL 8000 central processing unit communicates with the probes and sensors and with an autodialer in the event of a high level or probe/sensor failure. The liquid level probe also notifies the appropriate individuals that the tank needs to be pumped if liquid levels exceed a pre-set 63% level set point in the tank. The interstitial probe monitors the space between the inside tank wall and outside tank wall for leaks in the primary tank. If a leak in the collection header primary piping were to occur, the secondary piping would collect any liquid and discharge it into the collection sump. The sump probe monitors the watertight tank sump for liquid. The interstitial probe and the sump probe will trigger an alarm if liquid is detected. Refer to the Operations and Maintenance Manual for more information regarding the leachate collection system.

S&W conducted the monitoring equipment start-up for the leachate tank. The central processing unit and auto-dialer were programmed with alarm conditions and phone numbers for the VTDEC and DEC's response contractor. The monitoring equipment notifies the State and a pumping contractor when 63% of the tank capacity has been reached. Based on an average recharge rate of 8 gallons/hour, the tank will likely require pumping once per month. Refer to the Landfill Operations and Maintenance Plan for specific operation and maintenance of the monitoring equipment.

4.2.3 Leachate Piping Clean-out Damage

On July 20, 2000 clean out #3 was damaged by a front-end loader while moving soil on the access road. The clean-out riser was cracked at the 22 ¼ degree fitting above the "wye" connection to the main header pipe. Soil was excavated around the clean out, the damaged piping was cut and temporarily sealed using a mechanical plug to stop leachate discharge. Permanent repairs were then made by butt fusion welding using a new 22 ¼ degree fitting and riser section which were welded to the "wye" connection. A hydrostatic leak test was conducted for 5 hours on October 23, 2000. The repaired clean out and the primary and secondary piping passed the hydrostatic test and the secondary piping and the sump were drained and returned to service.

4.3 Cell #3 Construction

Re-mobilization to the site occurred on April 24, 2000 and construction activity resumed on May 8, 2000 with the removal of the temporary 12-mil flexible membrane installed over the landfill. The temporary liner was cut into manageable pieces and stockpiled for future use at the in the former location of the clarifier building at the Tannery Lagoons. Inspection of erosion control measures was conducted and minor repairs were completed to the silt fence and haybales.

At the winter shutdown Cell #3 was not filled completely to subgrade elevations and approximately 2,900 cy of airspace remained. Excavation activities at the Tannery Basement commenced the week of May 8, 2000 with approximately 800 cubic yards of nickel contaminated soil excavated, transported, and stockpiled in Cell #4 at the landfill. The nickel contaminated basement soil, intended for use on the sideslopes of the landfill as part of the cap system, did not meet the low permeability soil gradation specification. Instead of hauling the material off-site for disposal the material was placed in Cell #3.

Placement of the nickel contaminated soil in Cell #3 began on May 24, 2000. The material was hard to manage due to high moisture content and was determined to be unsuitable for filling cell #3. Placement of the material was stopped, the material was stockpiled, and later transported off-site for disposal.

Before surface preparation for the cap could commence the vat and sludge materials from tannery remediation were transported and placed in cell #3. Approximately 10 cy of sludge material was placed. The material was immediately covered with soil after placement in Cell #3 to control odors and allow for compaction of the sludge material.

4.4 Cap Construction

The initial step in cap construction consisted of preparation for the gas collection layer and began with puncturing the existing TFML over cells #1 and #2. Jackhammers with 30-inch bits were used on a 10-foot grid system to puncture the existing TFML.

The anchor trench along the western perimeter of the landfill was excavated. Construction of the anchor trench allowed placement of the excavated random fill to be used over cell #3. Clean off-site fill was brought to the site to complete the random fill layer over the landfill. Approximately 5,000 cy of random fill was placed and compacted on the entire landfill. Hill Engineering provided grade control to ensure accurate placement of random fill.

Three gas vents were installed in the locations surveyed by Hill as depicted on the project drawings. The gas vents were constructed of 4-inch diameter PVC and set directly into the random fill of the gas collection layer. Once the 12-inch of random fill and the gas vents were in place, the landfill was fine graded and inspected prior to the installation of geotextile materials.

The landfill cap design provides a double barrier system as shown on the USACE Project drawings. Chenango Contracting installed the geosynthetics in accordance with the manufacturer recommendations and the soil components were placed in accordance with the USACE Project Specifications. Geosynthetic material installation started on June 12, 2000 with the geocomposite gas collection layer at the south end of cell #3 and proceeded to the north end of the site.

The geocomposite material was manufactured by SKAPS Industries. The geocomposite was installed according to the manufacturer recommendations and the USACE Specifications. Chenango demobilized following completion of the geocomposite gas collection layer to allow for placement of low permeability soil on the eastern and southern sideslopes.

The low permeability soil was placed on the sideslopes to work in conjunction with the geosynthetic clay liner (GCL) placed on top of the landfill as a barrier layer. The low permeability soil was obtained from Hart's Pit in Pownal, Vermont. Approximately 1,000 cy of low permeability soil was placed in a 12-inch lift on the sideslopes and compacted using the bucket of a Komatsu 300 excavator and by tracking with a D3 bulldozer. Beck Engineering, Inc. (Beck) conducted field density testing for the low permeability soil. Compaction testing results satisfied the USACE specification for 85% compaction of low permeability soil. Chenango re-mobilized on June 19, 2000 to complete installation of the remaining geosynthetic liner layers.

Installation resumed with the placement of the GCL on the top of Cells #1, #2, and, #3. CETCO American Colloid Company manufactured the GCL and the material was installed according to the manufacturer recommendations and the USACE Specifications. GCL was deployed using an excavator positioned on the top of the landfill. Installation proceeded in an east to west direction. The GCL overlapped the low permeability soil layer to complete barrier layer #1. Geomembrane installation (barrier layer #2) began on June 19, 2000 at the south end of cell #3. The geomembrane was a 60-mil linear low-density polyethylene (LLDPE) material manufactured by Polyflex. Approximately 91,498 square feet of geomembrane was installed according to the manufacturer recommendations and the USACE Specifications.

Following geomembrane installation, Chenango began placement of the geocomposite drainage collection layer starting in Cell #3 down the southern sideslope. The geocomposite material was installed according to the manufacturer recommendations and the USACE Specifications. The geocomposite drainage collection layer was completed on June 26, 2000 completing the installation of the geosynthetic components of the cap.

The geosynthetic material manufacturers and TRI Environmental, Inc conducted third party geosynthetics testing as per the USACE specification. Testing was conducted prior to material shipment to the site and during installation to verify material conformance. The manufacturers provided roll testing and certification data for roll lots of geosynthetic material shipped to the site. The geosynthetic material was sampled at the site prior to and during installation as per the USACE Specification. Material testing results and installation testing results satisfied the USACE and manufacturers specifications.

The soil components of the cap were installed following the geosynthetic component installation including drainage protection sand, select fill, and topsoil.

The drainage protection sand was obtained from Robert Barlow's pit. Approximately 4,500 cy of drainage protection sand was placed on top of the geocomposite drainage layer. Placement required the construction of a 2-foot thick temporary haul road of drainage protection sand to protect the underlying liner. Placement advanced by working off of the road to place the material into a 12-inch lift over the entire landfill. A low ground pressure D3 bulldozer was used to spread the material. Following placement of the drainage protection sand layer, the select fill was installed.

Select fill material was supplied from Hart's pit. A 2-foot thick temporary haul road of select fill was constructed from the north to the south end of the landfill along the top of the eastern slope of the landfill. Visual inspection of initial material revealed that the select fill did not meet the USACE Specification. The subcontractor stopped placement and removed all select fill material from the top of the landfill. In order to meet specifications, the placed material was transported to Robert Barlow's pit where it was screened through a Read Screen-All. The balance of the select fill material at Hart's pit was also screened to meet specification prior to transportation to the site. Approximately 2,000 cy of select fill was placed in a 6-inch lift over the entire landfill.

Topsoil was obtained from Robert Barlow's pit. Topsoil was amended to meet the USACE Specification by screening and mixing approximately 300 cubic yards of cow manure procured from a local farmer. Topsoil was placed in a 6-inch lift via a D3 bulldozer and raked with chain link fencing to remove grouser markings on top of the landfill. The sideslope grouser markings were left to minimize erosion and aid hydroseeding. Approximately 2,000 cy of topsoil was placed and raked at the landfill.

4.4.1 Low Permeability Soil Investigation and Corrective Action

As part of S&W's quality control, it was determined that low permeability soil provided by the subcontractor did not satisfy the USACE specifications for grain size and permeability. As a result, additional sampling was conducted on July 11, 2000 of the in-place low permeability soil to determine permeability, field density, and grain size. GeoTesting Express conducted the sampling and laboratory analysis. The drainage sand was excavated in six locations and the geocomposite and geomembrane were cut to allow for sampling of the underlying low permeability soil. Chenango Contracting resealed the geomembrane and geocomposite drainage layer on July 13, 2000 in accordance with the USACE specifications. Field density testing was conducted using a Troxler and a sand cone was conducted at each location as per the USACE specification. Shelby tube samples and bag samples were taken to determine in-place compaction, permeability, and grain size distribution at each location. The results revealed that the low permeability soil did not meet the permeability and gradation requirements of the USACE specification.

Based on the low permeability soil investigation testing results, the USACE directed S&W to develop a corrective action for the underlying soil. Four alternatives were considered to provide a double barrier system for areas where low permeability soil was placed and compacted. The corrective measure approved by the USACE required an additional layer of geomembrane on all the affected sideslopes.

The low permeability soil corrective action started on September 5, 2000 with the removal of approximately 180 cy of drainage sand. The sand was removed along the ridge of the eastern and southern sideslopes to expose the geocomposite drainage layer. The majority of the sand removal was conducted using an excavator with a grading bucket and the balance was removed using polyethylene hand shovels to protect the underlying geotextiles. The existing geocomposite drainage layer was cut parallel to the top of slope and peeled back to expose the geomembrane. A new 60-mil LLDPE geomembrane was fusion welded to the existing geomembrane installed in June 2000. Following the installation of the new geomembrane, a new layer of geocomposite drainage layer was placed on the sideslopes and tied into the existing geocomposite drainage layer. The new geomembrane and geocomposite were tucked into the stone and behind the filter fabric in the anchor trenches. Drainage sand was backfilled over the sideslopes and the remaining components of the cap were installed according to the cap details as shown on the project drawings. The low permeability soil corrective action was completed on October 4, 2000.

4.4.2 Gabion Wall Construction

Gabion wall construction started at the north end of the landfill following liner installation. A base for the gabions was constructed from 3-inch (minus) material with a 7-degree batter. Approximately 252 feet of 6-foot high gabion wall was installed as well as 340 feet of 4.5-foot high wall. Each gabion basket was filled with stone with an excavator and then the stone was adjusted by hand. The baskets were tied with wire and a 6 oz. non-woven geotextile was placed behind the gabion wall. A 2-foot wide layer of select fill was placed and compacted behind the gabion wall.

4.4.3 Access Road and Landfill Access Ramp Construction

The access road was constructed following the installation of the gabion wall. The subgrade was established, fine graded, and the overburden stockpiled in Cell #4. A non-woven geotextile fabric was installed above the compacted subgrade and a 12-inch final course of 3-inch (minus) material was placed and compacted. The gabion wall was keyed into the final course of 3-inch (minus) material for the access road.

The final grading of the eastern sideslope of the access road required regrading in order to stabilize the new access road and minimize erosion. As a result, the entire eastern edge was grubbed, regraded, and rip-rapped to minimize erosion, improve safety for truck use, and provide storage for plowed snow.

Streetboxes for the leachate header pipe clean-outs were set to finish grade in the roadway and four (4), 4-foot square concrete pads were installed around the boxes. Reflector posts were installed every 20-feet along the eastern edge of the access road and 15-feet off of the gabion wall to mark the edge of road.

The access ramp to the top of the landfill was fine graded and a final course of 3-inch (minus) material installed.

4.5 Landfill Site Restoration

The entire landfill cap and Cell #4 were hydroseeded and fertilized in accordance with USACE specifications on October 19, 2000. The equipment laydown area across from Barlow's pit was graded and seeded and potholes in Burdick Drive were filled with 3-inch (minus) material. Erosion control blankets manufactured by American Excelsior Company were installed in accordance with the manufacturer's recommendations on entire the landfill cap and sideslopes.

The bollards around the leachate tank were primed and painted safety yellow. The streetboxes for the sump, interstitial probe, and leachate header pipe clean out were set to grade and a concrete pad was installed around the streetboxes.

The old perimeter fencing was removed and replaced with approximately 2,000 linear feet of new chain-link fencing. The new western perimeter fence was installed 1-foot inside the surveyed property line. The new eastern fence was installed along the toe of the new rip rap on the sideslope and a new pedestrian gate was installed near toe drain outlet pipe #1. A new vehicle access gate was installed at the entrance to the landfill. Signage was installed on the fencing along the entire landfill perimeter.

[This page intentionally left blank]

5 LAGOON AREA

5.1 Lagoon Transfer Pipe Removal

Approximately 800 linear feet of 18-inch diameter and 800 linear feet of 6-inch diameter transite pipe, several concrete manholes and a concrete pit were excavated and removed from beneath the Lagoon access road. The pipes were formerly used to convey primary treated wastewater and sludge from the Screen House to the Lagoons. Approximately 350 cubic yard of overburden soil were transported and placed in Cell 3 of the onsite landfill. Sludge removed from inside the pipe was also placed in Cell #3. Concrete debris and manholes were transported off-site to a C&D landfill with other tannery demolition debris. The transite pipe was disposed of with the other ACM removed from the tannery.

Documentation samples were obtained on 200-foot intervals from the bottom of the excavation. Polyethylene sheeting/liner was placed in the trench prior to being backfilled and compacted with clean fill material from Barlow's Pit. The surface of the access road was then regraded.

5.2 Clarifier Building Decontamination and Demolition

The clarifier building, the rectangular concrete clarifier tank and the four adjacent cylindrical vertical steel tanks located adjacent to Lagoons 2 and 3 were decontaminated. Decontamination activities consisted of removal of accumulated tannery sludge using hand labor, buckets and shovels. The sludge was transferred to lined roll-off containers. Following gross sludge removal, the walls and floor were mechanically scraped and broom cleaned. The vertical steel tanks were extracted from the ground, crushed and transported to a steel recycling facility. The clarifier building and the adjacent valve shed were demolished. The demolition debris consisting of the wood frame and metal siding was transported to a C&D landfill with other tannery demolition debris. The concrete clarifier tank was backfilled and compacted with clean soil from Barlow's Pit.

Sludge removed from the clarifier tank and four vertical steel tanks was transported to the on site landfill and placed in Cell #3.

Documentation wipe samples were obtained from the four walls and floor of the clarifier tank prior to backfill.

The chain link security fence and gates in the area of the former clarifier building and Lagoons 2 and 3 were re-installed after completion of the demolition work.

[This page intentionally left blank]

6 AIR MONITORING

6.1 Ambient Air Monitoring Objectives

A real time ambient air monitoring program was conducted for airborne respirable dust at the perimeter of the work area to verify that concentrations did not exceed established action levels during Site Removal Actions activities. Real time respirable dust monitoring was also performed at selected locations within the Removal Action work area during specific activities to ensure that adequate dust suppression measures were taken. Sample locations are shown on Figure 5.

The real time dust monitoring program was conducted throughout the duration of the Removal Action, and assessed total dust concentration levels and not specific contaminants. In reviewing relative concentrations of contaminants found in the soil and sludge, an action level of $1 mg/m^3$ of dust was allowable to ensure within a reasonable degree of accuracy that the PELs for contaminants of concern were not be exceeded.

Monitoring for the pre-construction activity involving PCP removal was also conducted using the real time dust monitors. During this activity, however, because the concentration levels of PCP were determined to be very high, it was presumed that all readings obtained were attributed only to the PCP.

Asbestos air monitoring was also conducted during and immediately following abatement activities as required by USEPA and VTDEC regulations. Asbestos monitoring was performed via collection and off-site analysis of air samples in accordance with NIOSH Method 7400. Samples were analyzed on 24-hour turnaround to provide immediate response to action level exceedances. The asbestos abatement subcontractor conducted all asbestos air monitoring appropriate to their task during the course of the project.

6.2 Ambient Air Monitoring Action Levels

Action levels were established for asbestos and dust in ambient air at the Site. Action levels were protective of human health and the environment and were derived from Applicable or Relevent and Appropriate Requirements (ARARs). ARARs for ambient air monitoring at this Site are:

Chapter 40, Section 50.6 of the Code of Federal Regulations (40 CFR 50.6)	National Primary & Secondary Ambient Air Quality Standards for PM (10)
29 CFR 1926.1101	Occupational Safety and Health Standards for the Construction Industry – Asbestos

Action levels, presented in the Table 6-1, were derived from applicable or relevant and appropriate regulations (ARARs) and were protective of human health and the environment.

Table 6-1 AMBIENT AIR MONITORING ACTION LEVELS

Pownal Tannery Superfund Site North Pownal, Vermont Ambient Air Monitoring Action Levels		
MATERIAL OF CONCERN	**ACTION LEVEL**	**REFERENCE**
Asbestos	0.01 fibers/cc	29 CFR 1926.1101
Respirable Dust (Perimeter)	0.15 mg/m^3	40 CFR 50.6
Respirable Dust (Work Area)	5 mg/m^3	Good Engineering Practice

For PCM analysis, the action level for asbestos at the Site perimeter, for each airborne sample, was less than 0.01 fibers per cubic centimeter (f/cc) of air as an eight-hour time-weighted average (29 CFR 1926.1101). Any laboratory analysis result which exceeded 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) was confirmed from that same filter in accordance with TEM.

Air sample fiber counting were completed and results provided within 24 hours after completion of a sampling period. Written sampling results were provided within five working days of the date of collection. The air sampling results were documented on the daily air monitoring log and weekly construction report.

Dust concentrations at the Site perimeter were less than 0.15 milligrams per cubic meter (mg/m^3) for particulate matter with an aerodynamic diameter less than or equal to 10 μm using a 24-hour average concentration (40 CFR 50.6). Dust concentrations within the work area did not exceed a 10 second average of five mg/m^3 for particulate matter with an aerodynamic diameter less than or equal to 10 μm.

Dust concentrations were real-time measurements. Written results were available within 24 hours after a sampling period. Sampling results were documented on a daily air-monitoring log and in daily QC reports.

7 SAFETY PERFORMANCE

Work performed at the Pownal Tannery Superfund Site conformed to the requirements of the Site Safety and Health Plan (SSHP) which was implemented by Stone & Webster's SSHO.

The Site was "secured" using signage, fencing, and warning tape (i.e., CAUTION,DANGER, etc.) as necessary to provide warning to site hazards and to prevent unauthorized access to the Site and support areas.

All workers were required to use personal protective equipment (PPE), and industrial hygiene sampling was performed to monitor and document the adequacy of the PPE and other safety measures. Ambient air monitoring was also performed at/around the Site perimeter.

The project's safety statistics are zero reportable incidents and no lost-time incidents. Total Site hours, for all project-related personnel were 37,466. The safety statistics, on a monthly, annual (YTD) and project-to-date (PTD) basis are given in Table 7-1.

Table 7-1 Project Safety Statistics

Pownal Tannery Superfund Site North Pownal, Vermont Project Safety Statistics							
		Reportable Incidents			Lost Time Incidents		
Month/Yr	Hours	Month	YTD	PTD	Month	YTD	PTD
May 1999	176	0	0	0	0	0	0
June 1999	1259	0	0	0	0	0	0
July 1999	2577	0	0	0	0	0	0
August 1999	3774	0	0	0	0	0	0
September 1999	2959	0	0	0	0	0	0
October 1999	2862	0	0	0	0	0	0
November 1999	2948	0	0	0	0	0	0
December 1999	3627	0	0	0	0	0	0
January 2000	2505	0	0	0	0	0	0
February 2000	192	0	0	0	0	0	0
April 2000	251	0	0	0	0	0	0
May 2000	2059	0	0	0	0	0	0
June 2000	3622	0	0	0	0	0	0
July 2000	1579	0	0	0	0	0	0
August 2000	1289	0	0	0	0	0	0
September 2000	1929	0	0	0	0	0	0
October 2000	1929	0	0	0	0	0	0
November 2000	1929	0	0	0	0	0	0
Total	37466	0	0	0	0	0	0

[This page intentionally left blank]

8 SUMMARY OF PROJECT COSTS

The Summary of project cost are contained in Table 8-1

Table 8-1 Summary of Project Costs

Pownal	Amount
Mob & Demob	$ 342,000
Site prep & Security	$ 55,000
Pre Design Investigations & Work Plans	$ 445,000
Decon	$ 440,000
Bldg demo & disposal	$ 1,848,500
Asbestos & UST removals	$ 247,000
Soil removal & disposal	$ 870,000
Site restoration	$ 750,000
Leachate Collection Upgrade	$ 473,000
Landfill Cap Construction	$ 960,000
Planning, supervision & procurement	$ 610,000
Project management	$ 365,000
Total	**$ 7,405,500**

[This page intentionally left blank]

9 REFERENCES

1. U.S. Environmental Protection Agency, Region I, "Action Memorandum: REQUEST for a Non-Time Critical Removal Action at the Pownal Tannery Site, Pownal, Vermont," March 22, 1999.
2. Stone & Webster Engineering, Inc, “Work Plan for Pownal Tannery Site, North Pownal, Vermont,”
3. Tetra Tech NUS, Inc. “Final Engineering/Cost Analysis, Pownal Tannery Site, North Pownal, Vermont,” November 1998
4. GZA, “ Letter Report Calculation of Site Specific Soil Screening Levels” November 15, 1999.
5. Nobis Engineering, “Asbestos Survey Report, Pownal Tannery Site, North Pownal, Vermont,”,
6. Stone & Webster Engineering, Inc, ”Historical Documentation Report, Pownal Tannery Site, North Pownal, Vermont,”
7. Stone & Webster Environmental Technology and Services, Inc. “Evaluation of Disposal Options for Building Decontamination Waste, Pownal Tannery Site, North Pownal, Vermont,” July 1999.
8. Stone & Webster Environmental Technology and Services, Inc. “Disposal Characterization Results for Building Deconstruction Waste, Pownal Tannery Site, North Pownal, Vermont,” September 1999.
9. Stone & Webster Engineering, Inc, “Asbestos Abatement Report, Pownal Tannery Site, North Pownal, Vermont,”
10. Stone & Webster Environmental Technology and Services, Inc. “Abbreviated Sampling and Analysis Plan, Pownal Tannery Site, North Pownal, Vermont,” March 1999
11. State of Vermont Department of Environmental Conservation (DEC), "Hazardous Waste Management Regulations," Effective September 30, 1999

[This page intentionally left blank]

FIGURES

[This page intentionally left blank]

Figure 1 Site Location Map

[This page intentionally left blank]

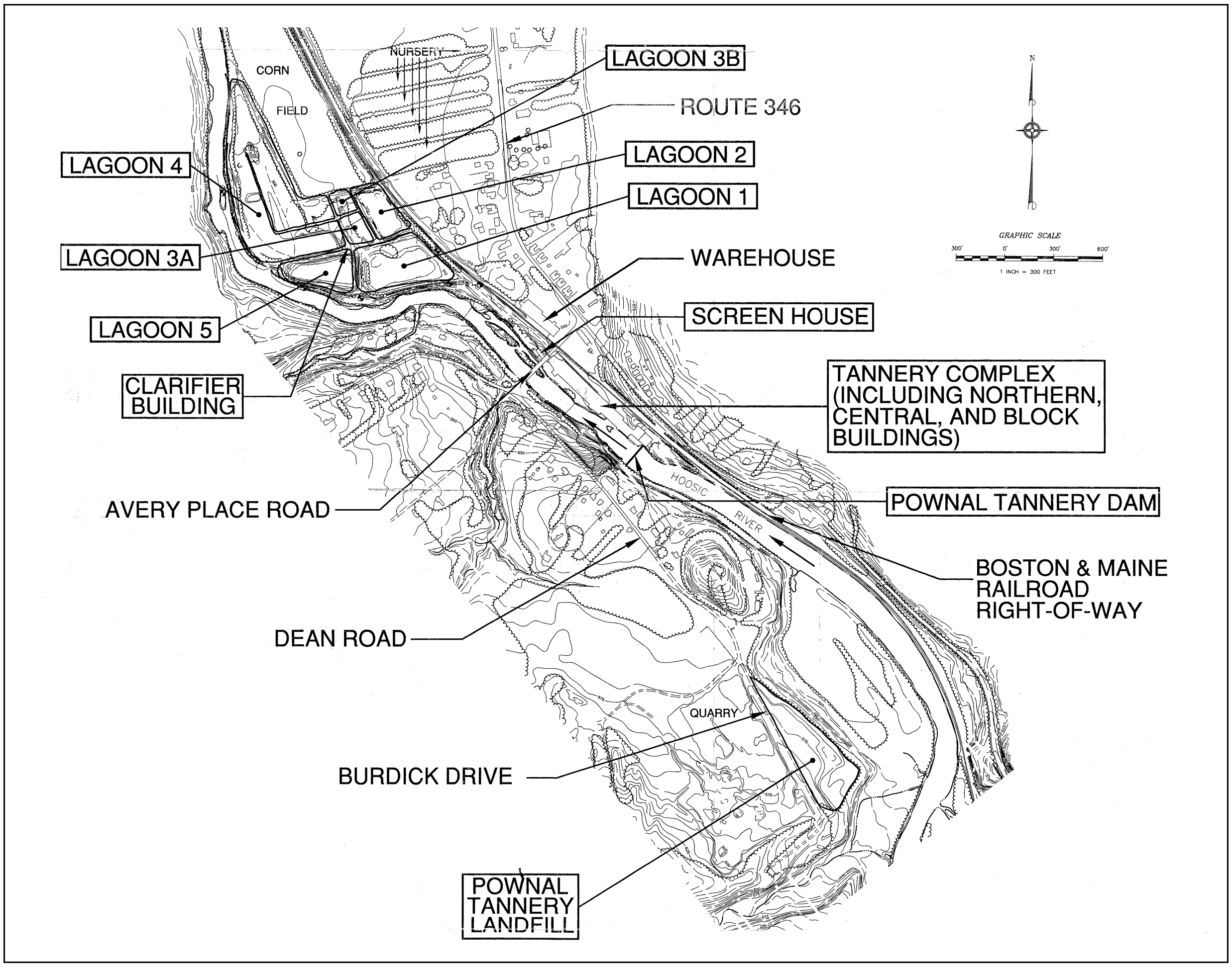
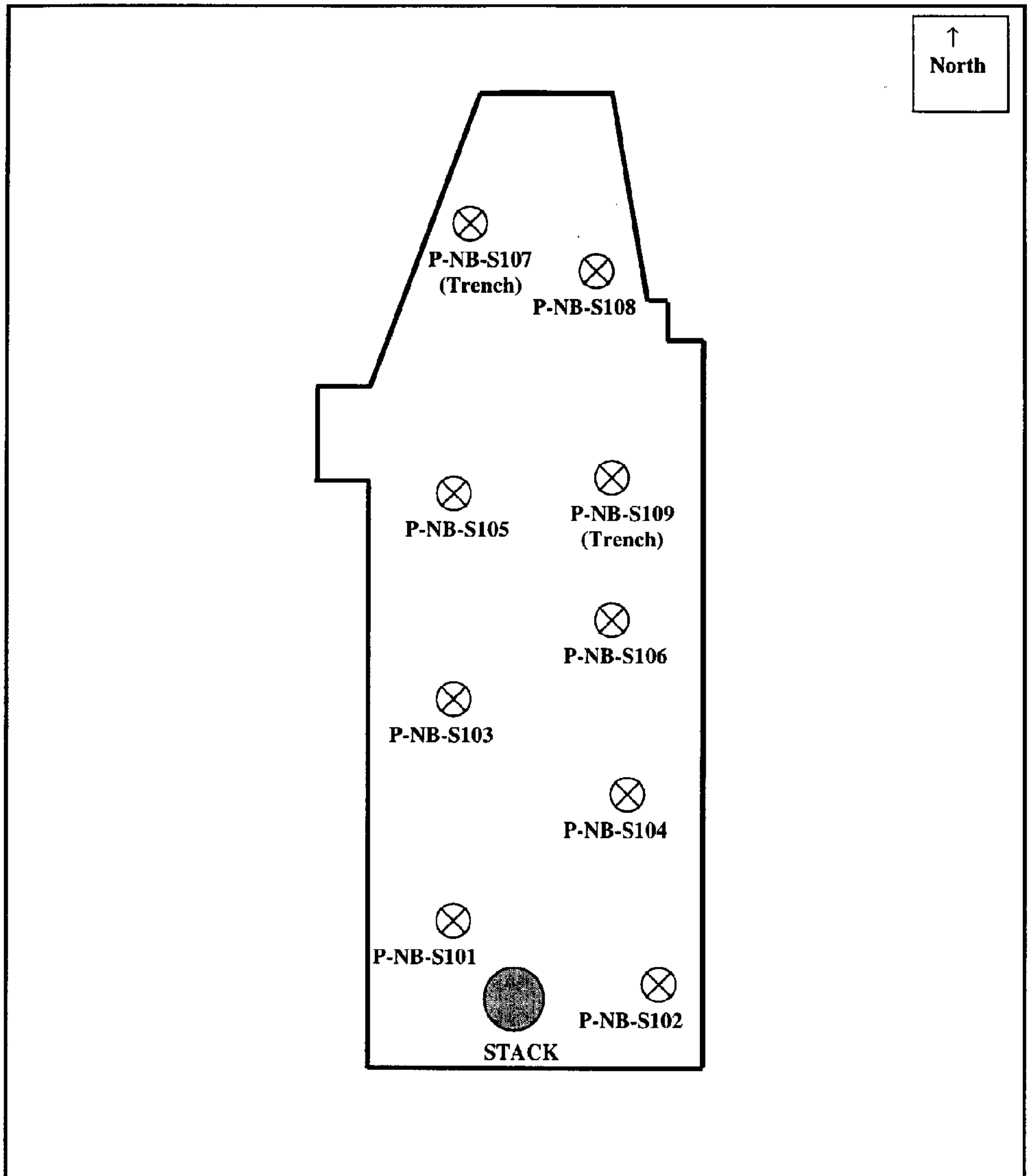


Figure 2 General Site Layout

[This page intentionally left blank]



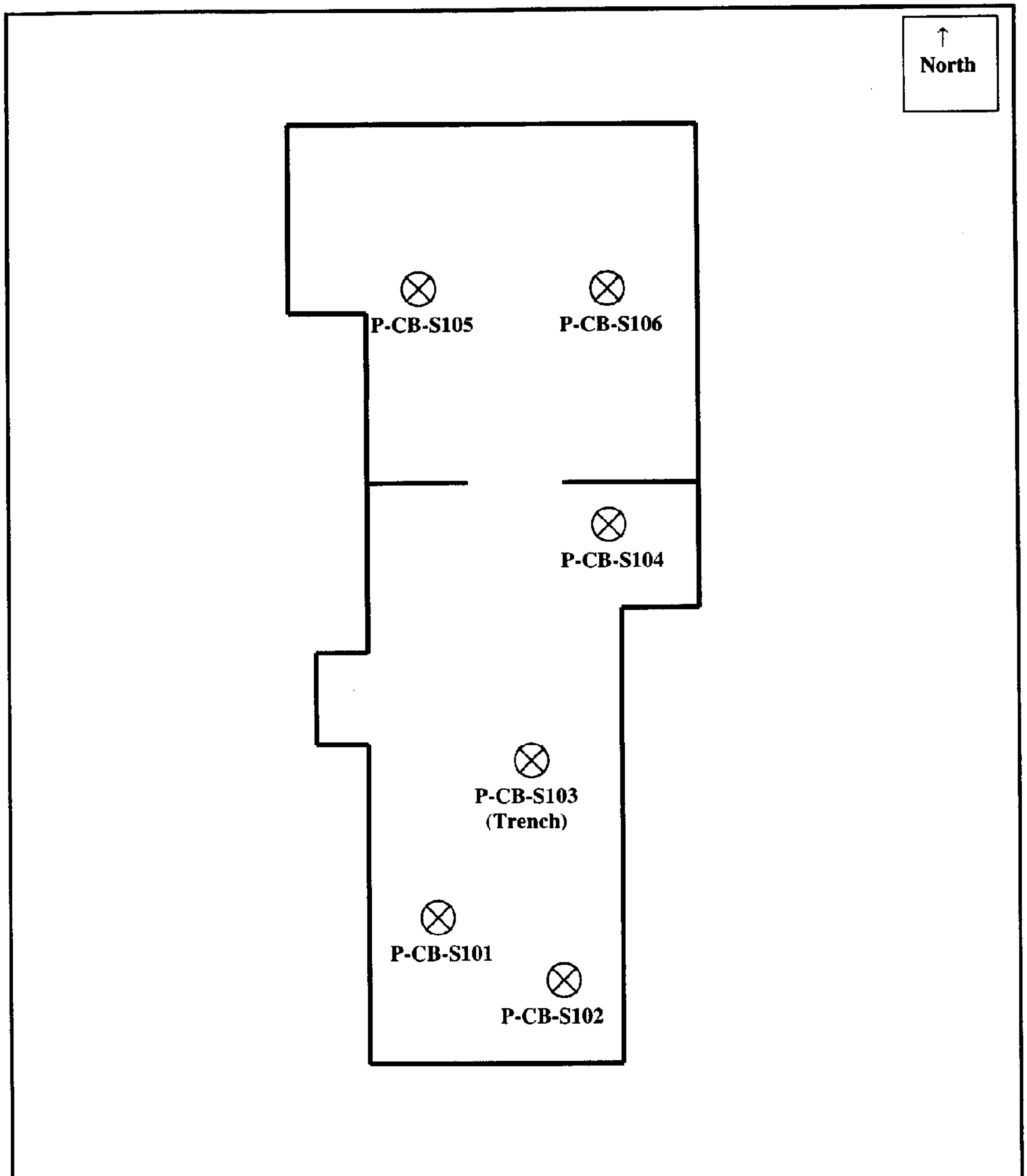
Basement Soil Sample Locations

Northern Building Footprint
(Not to Scale)
Pownal Tannery Site
North Pownal, VT

Figure 3

Stone & Webster
November 1999

[This page intentionally left blank]



Basement Soil Sample Locations

Central Building Footprint
(Not to Scale)
Pownal Tannery Site
North Pownal, VT

Figure 4

Stone & Webster
November 1999

[This page intentionally left blank]

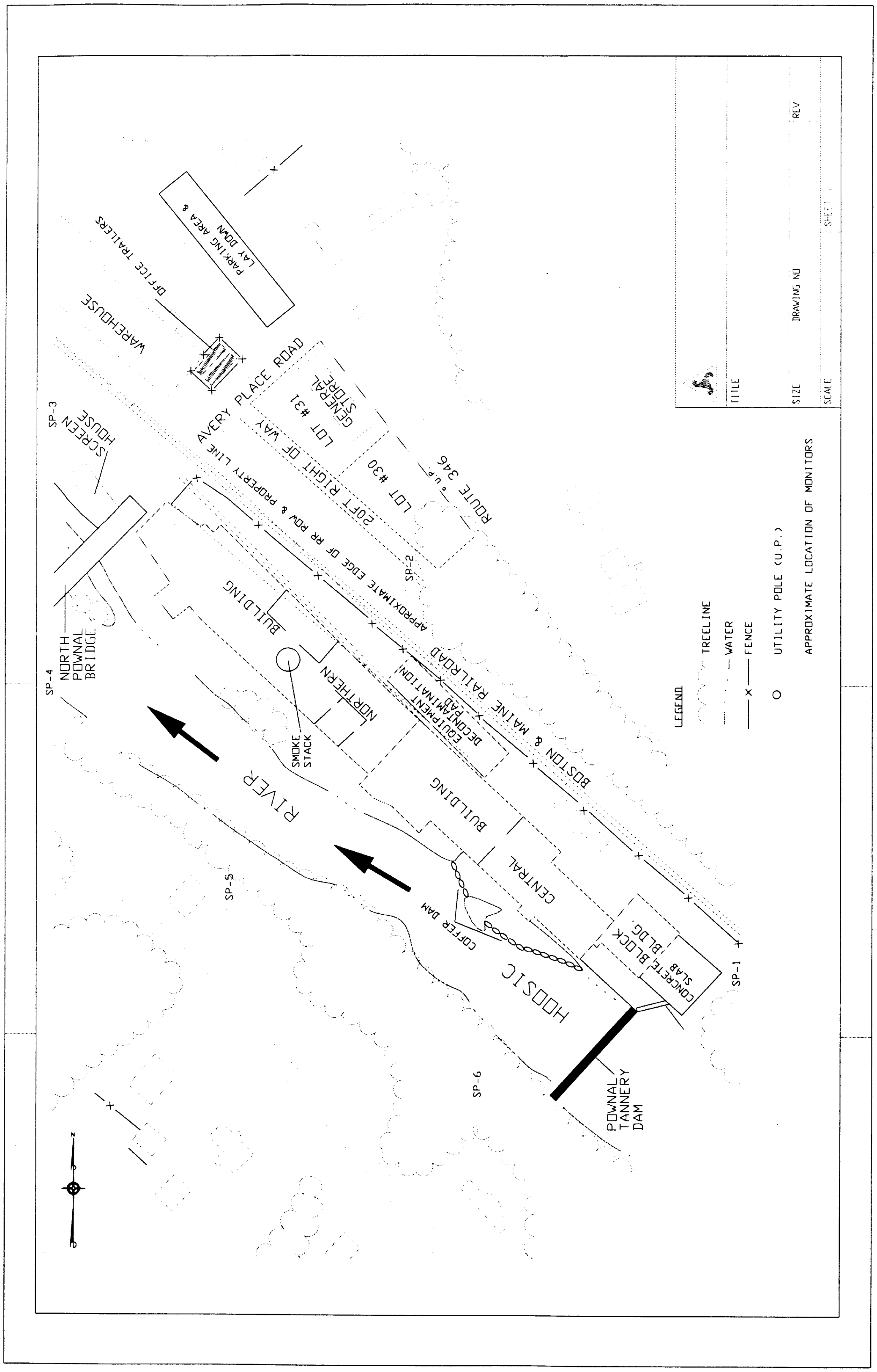

PARKING AREA & LAY DOWN
OFFICE TRAILERS
WAREHOUSE
SCREEN HOUSE
SP-3
AVERY PLACE ROAD
LOT #31
GENERAL STORE
LOT #30
20FT RIGHT OF WAY
ROUTE 346
U.P.
APPROXIMATE EDGE OF RR ROW & PROPERTY LINE
SP-2
BOSTON & MAINE RAILROAD
NORTHERN BUILDING
EQUIPMENT DECONTAMINATION PAD
SMOKE STACK
NORTH POWNAL BRIDGE
SP-4
RIVER
CENTRAL BUILDING
COFFER DAM
HOOSIC
CONCRETE BLOCK BLDG.
CONCRETE SLAB
SP-1
SP-5
SP-6
POWNAL TANNERY DAM
LEGEND
TREELINE
WATER
FENCE
UTILITY POLE (U.P.)
APPROXIMATE LOCATION OF MONITORS
TITLE
SIZE
DRAWING NO
REV
SCALE
SHEET

Figure 5

[This page intentionally left blank]

APPENDIX A
SITE CONSTRUCTION PHOTOS

[This page intentionally left blank]

APPENDIX B

AS-BUILD DRAWINGS

[This page intentionally left blank]

APPENDIX C
WASTE SHIPPING RECORDS

[This page intentionally left blank]

APPENDIX D
SUMMARY OF CONFIRMATORY & DOCUMENTATION SAMPLING RESULTS

[This page intentionally left blank]

APPENDIX E
NORTH BUILDING BORING HOLE LOGS

[This page intentionally left blank]